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STAFF REPORT

COAL FROM THE NATION:
HOUSEHOLD DEMAND FOR ELECTRICITY

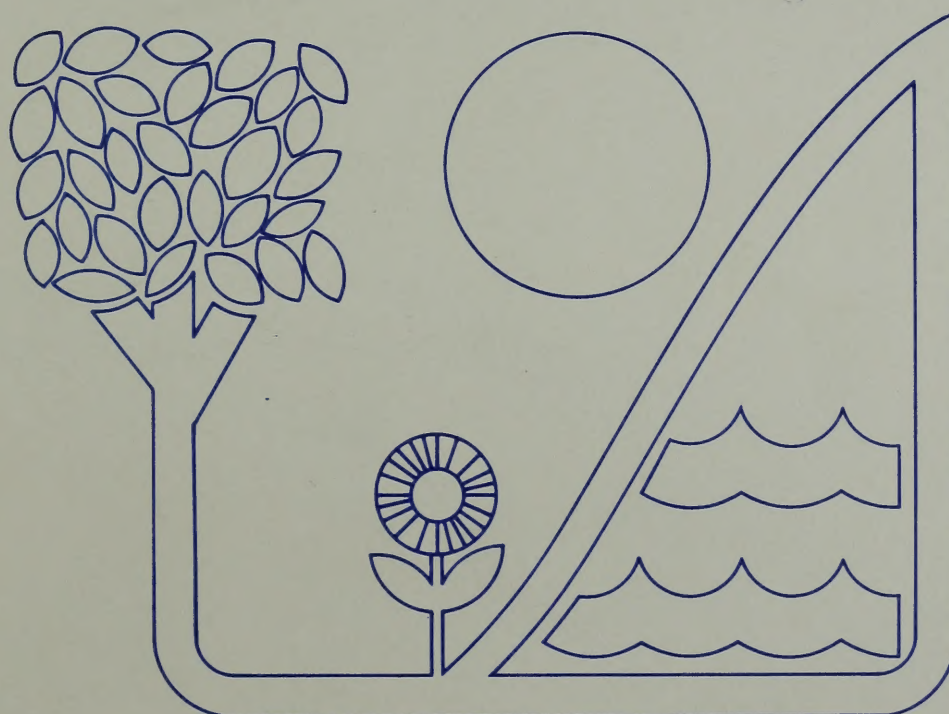
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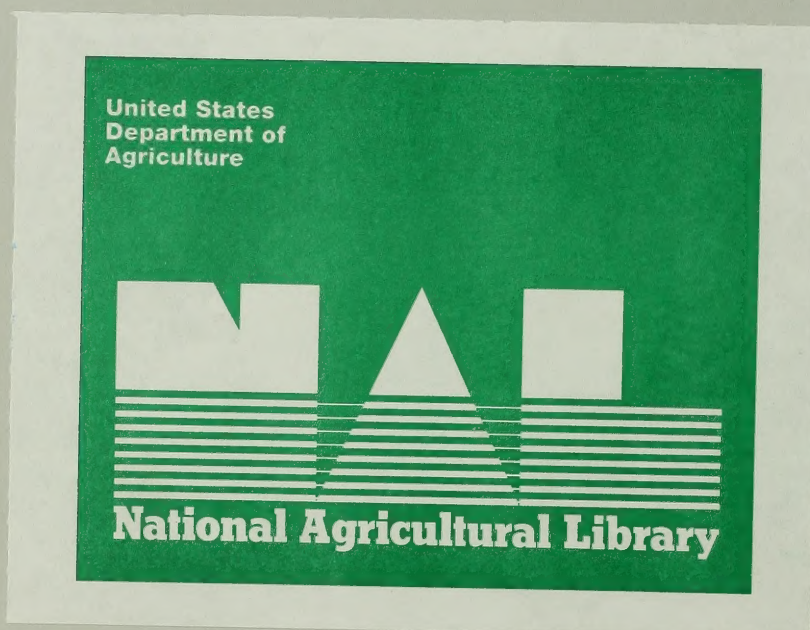
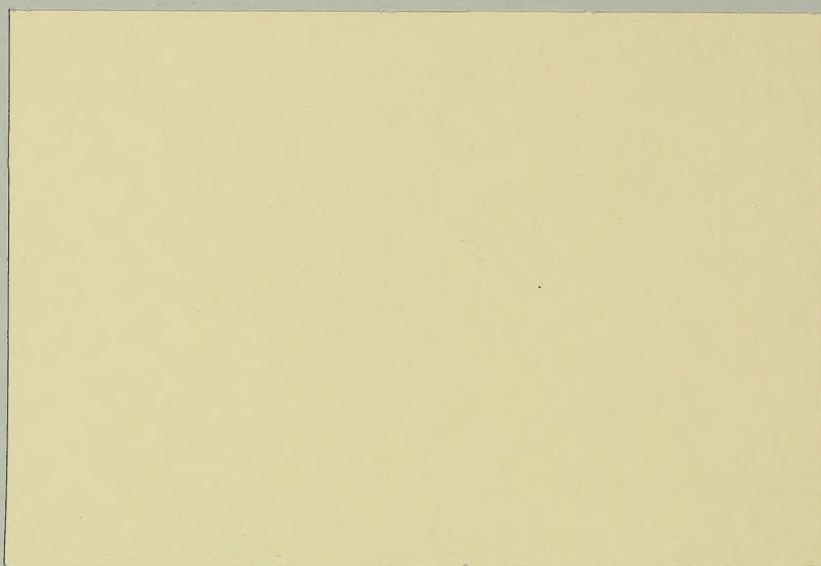
John R. McKean
John W. Green

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United States
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of
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COAL FROM THE NATION:

HOUSEHOLD DEMAND FOR ELECTRICITY

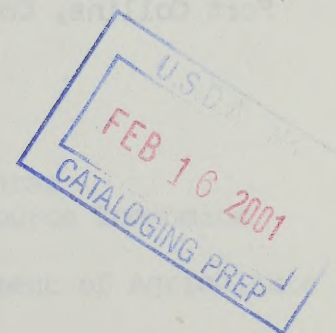
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June, 1982



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ABSTRACT

This report summarizes the econometric theory surrounding estimation of residential demand functions and describes the methodology used to develop residential electricity demand functions for 136 utility service areas. A single equation function is described; its functional form is log-linear. Special treatment is given cost-of-living differences and climatic variables. The demand equations were estimated in two stages. The selected model contained humidity as a second weather variable, is adjusted for heteroskedasticity, and has all variables correct in sign and approximate magnitude. Elasticities are reported for income and prices and compared to previous studies. Price and income projections are then used to predict 1985 electricity sales.

Keywords: electricity, demand econometrics, coal, households, model

This paper was prepared for limited distribution to the research community outside the U.S. Department of Agriculture.

Authors

Dr. John R. McKean is a Professor in the Economics Department at Colorado State University, Fort Collins and was Principal Investigator on the contract which developed this work.

Dr. John W. Green is a Regional Economist and Project Leader, Natural Resource Economics Division, Economic Research Service, U.S. Department of Agriculture located in the Economics Department, Colorado State University, Fort Collins, Colorado and contract monitor for this work.

FOREWORD

The research activities and results described in this report are part of a project entitled "Integrated Assessment: Economic and Social Consequences of Coal and Oil Shale Development." This project is supported jointly by the U.S. Department of Agriculture (USDA) and the Environmental Protection Agency (EPA) as a component of the Federal Interagency Energy/Environment Research and Development Program. The overall project focuses on identifying and analyzing certain interrelationships between society's needs for energy, environmental quality, and agricultural production and the impacts of alternative public policy strategies for dealing with these needs.

The econometric model developed in this contractor's report is both utility service area and national in scope. It illustrates the logic and structure of an econometric household electricity demand model useful in deriving the demand for coal to produce electricity. The model development work described in this report has been halted. Our purpose of this report is to describe completed work, to simulate discussion of the basic concepts, and to solicit comments and suggestions. Colleagues in the energy demand modeling field, as well as individuals actively involved in related policy analysis, are encouraged to send their comments to the authors or to us.

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SUMMARY

The average residence in the U.S. consumes about 660 kWh of electricity per month, more than two-thirds of which is produced using coal as a fuel. Power plants require about 65 gallons of oil, 660 pounds of coal, or 9,000 cubic feet of natural gas to generate that 660 kWh of electricity each month. Income and other factors play a role in residential electricity consumption but the relationship is not as direct as the relationship between production and electricity use in the industrial sector.

The goal of the project reported in this study was to provide a model that could be used to project electricity consumption by households in specific service areas. The projections can be used in the Interregional Coal Analysis Model to evaluate impacts of coal development on rural resources and communities.

A single equation least-squares demand function was selected to project household electricity consumption in 1985. The functional form of the demand equation is log-linear and special treatment is given variables describing service areas and climate. The primary data sources include Federal Energy Regulatory Commission, Bureau of Census, County and City Data Book, American Gas Association, and Department of Commerce-Department of Agriculture OBERS projections.

Existing studies of residential electricity demand are extremely heterogeneous in the structuring of their models and in their research findings. All studies agree that prices are important but different methodologies are employed to describe buyer and seller behavior. Several controversies concerning model specification exist among researchers. These include marginal versus average price, simultaneous supply and demand modeling, and impacts of historical fuel prices.

Over three-fifths of previous studies use either time series or pooled cross section-time series methods. The pooled and pure time series models invariably use the distributed lag technique to model the demand function. Adoption of this technique allows the use of short run time series data to estimate both short run and longer run price elasticities. Both time series and pooled time series-cross section analyses also incorporate distributed lag relationships in order to remove serial correlation. Unfortunately, the use of time series data presents several problems, including trends in the variables. It is impossible to say to what degree the relationship among these variables is spurious rather than reflecting a true interdependence. Thus, time series data present some insoluble problems. Improper specification of the model can result in bias in the elasticity estimates.

Time series data also suffer from collinearity since nominal "independent" variables contain trends which make them correlate highly to each other. Cross section analyses avoids the problem of contemporaneous trends although some collinearity may still exist.

Having rejected the time series and dynamic modeling approaches implied by time series data, only the pure cross section alternative remains. The

approach chosen utilizes cities making up utility service areas as sample observations. Thus, a cross section regression equation is estimated across selected cities in the U.S. The statistical model is consistent with the comparative static framework of analysis whose properties are more completely understood than dynamic economic models.

The model incorporates both monetary and physical variables, i.e., electricity consumption is affected by the prices of electricity and closely related goods, consumer income, and by nonmonetary variables such as climate and weather. All prices and income are expressed in real terms to remove unwanted variation caused by changes in the cost of living.

The estimating procedure was undertaken in two stages. The first stage involved the examination of several alternative measures of the hypothesized causal variables for 102 cities. Demand equations were specified and a preliminary recursive model approximated for further testing using better American Gas Association consumer price data. The second stage consisted of reestimating the demand equations specified in the first stage using a surrogate price index to adjust the monetary variables in an expanded 138 city sample necessitated by the need for forecasts for utility service areas. The use of the surrogate price deflator index allowed the expansion of the deflated demand estimates from a sample of 57 to the total of 138 cities. The use of deflated cross section data greatly improved the accuracy of the estimated equations. Average real spending by city per family for household electricity in 1975 varied from \$151 to \$545. The mean deflated electricity price of the sample data for 1975 was \$38.64 per thousand kWh, the mean deflated household income was \$11,854. The estimated model was very robust.

Six equations are presented in the second stage of the empirical investigation. All the final equations may be described as log-linear. Separate and pooled regressions are presented to allow adjustment for bias resulting from inclusion of surrogate deflators. Elasticities are shown for electricity price, income, and natural gas price by city. The demand equations are shown in both log-linear and product form on page 89 and will not be repeated here. Tables 10 through 15 present 6 demand equations. Coefficients of determination range from 0.842 to 0.978.

Model I is the demand equation for the subsample of 57 cities for which actual price deflators were available. Model II is similar except it was fitted to the sample of 81 cities for which the surrogate inflator was required. Models I and II incorporate dummy variables which shift the demand equation up or down to adjust for variation among states in the rate of household electricity consumption.

Model III combines the sample data included in Models I and II for a sample size of 138 cities. The sign on the natural gas variables is "wrong" if natural gas is to be considered a substitute for electricity; a result which has been reported in other studies. Model VI does not differentiate among real or surrogate price deflators and contains humidity as a second weather variable. Model VI is also adjusted for heteroskedasticity.

Models IV and V are similar to Models I and II except that the stepwise regression program was calibrated to allow state price elasticity dummy

variables to enter. This allows both the slope and intercept coefficients to vary by state. Inclusion of both effects leads to high correlation among independent variables and possible estimation errors. The net addition to explanation resulting from addition of independent variables in models IV and V is quite small.

Model VI, which pools the two data sets contained in Models I and II, has been selected as the prediction equation best suited to provide consumption forecasts for 136 utility service areas. Model VI is superior to Model III which estimated the wrong sign for natural gas prices deflated by the "real" price index. The use of weighted least squares to adjust for heteroskedasticity increased the efficiency of Model IV and a second weather variable was also significant. All signs were theoretically correct and reasonable in magnitude. The historical data, projected inputs, econometric model, and consumption forecasts are summarized in Figure 5.

Our price elasticity estimate of -0.72 is slightly lower than those in previously reported studies (Tables 2 and 3). Our cross elasticity to natural gas price (0.10) is also lower than previous estimates. Our income elasticity of 0.35 is also below the average of other pure cross section models. Although our elasticity estimates tend to be smaller in absolute value than previously reported estimates, few of the estimates differ markedly. Several factors could account for our smaller elasticity estimates; they are discussed beginning on page 101.

Department of Energy electricity price change projections were applied to our electricity price data in order to utilize our estimated demand equation to predict future electricity sales. DOE historical and projected natural gas prices were used in the same manner. Family income projections were derived using Bureau of Economic Analysis data. Long run average heating degree days was used as the predictor of heating degree days in 1985. Thus, the separate influences of changes in a particular city's energy price structure and income level on electricity consumption are indicated. The effects of changes in prices and incomes depend both on the elasticity estimated by the regression model and on the amount of price and income changes projected by DOE and BEA for 1985.

The primary goal of the research presented here was to project household electricity demand in 1985 for specific utility service areas. For projection purposes, we have utilized a simplified model which combines changes in appliance stocks and changes in utilization rates into the price effect. But we have also determined that long run electricity demand projections should consider changes in shares of appliances powered by electricity. Further research support would enable us to (1) continue the development of our data set, (2) more fully utilize the superior AGA substitute fuel price data, (3) continue the development and testing of several alternative models of the market for residential electricity, and (4) estimate the coal-fired electricity demand of those utilities not represented by SMA data. A two equation model should be developed in which the first equation relates quantity of electricity demanded per customer to the price of electricity, weather conditions, and the level of saturation of ownership of residential electrical appliance stocks. The second equation would relate the saturation levels of ownership to the price of electricity, the prices of competing fuels, income, climate, and other regional socioeconomic characteristics. Some exploratory modeling has been performed along these lines and is reported in Appendix II.

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COAL FROM THE NATION: HOUSEHOLD DEMAND FOR ELECTRICITY

John R. McKean* and John W. Green**

CHAPTER I. INTRODUCTION

Household Electricity Demand and Coal

Residential electricity consumption is already the largest single source of demand for coal in the United States. More than two-thirds of U.S. coal production is used to generate electricity. Potentially, much larger demands for coal may occur as alternative fuels grow more expensive to extract or to import and if nuclear generation continues to lose appeal. Household use of electricity provides a "derived" demand^{1/} for coal. The average residence in our nation consumes about 660 kWh per month of electricity. In order for an electric utility to supply a household's monthly demand, approximately 65 gallons of oil, 660 pounds of coal, or 9,000 cubic feet of natural gas must be consumed at the generating plant. Additional amounts of energy are used indirectly to mine and transport the fuels used to power the generators and to provide the human and capital inputs necessary to the electric power industry infrastructure. Electricity provided about 14 percent of the residential energy requirements in 1978. Electric utilities accounted for 30 percent of total energy use in the U.S. in 1978.

The nature of consumer spending is such that forecasts are necessarily more complex than for industrial spending. Coal or electricity is a factor of production purchased by manufacturers in proportion to the value of their output. Industrial energy use is closely related to production. Although consumer spending is ultimately constrained by the value of production, i.e., by their income, consumers in the U.S. normally have a large amount of discretionary income to spend as they desire. Income plays a role in residential electricity consumption but there is no direct tie between production and electricity use as exists in the industrial sector. Electricity as a final demand sale to households is subject to a large variety of influences.

Electricity Demand Growth

An energy study (sponsored in part by the Ford Foundation Energy Policy Project) by E. A. Hudson and D. W. Jorgenson (67) utilized a pioneering approach combining econometric models with input-output (Leontief) models to

^{1/} Coal is consumed indirectly by households who purchase electricity which is produced from coal.

*Dr. John R. McKean is a Professor in the Economics Department at Colorado State University, Fort Collins and was Principal Investigator on the contract which developed this work.

**Dr. John W. Green is a Regional Economist and Project Leader, Natural Resource Economics Division, Economic Research Service, U.S. Department of Agriculture located in the Economics Department, Colorado State University, Fort Collins, Colorado and contract monitor for this work.

relate patterns of economic growth to the demand and supply of energy.^{2/} The study simulates the workings of the U.S. economy with exogenous impacts by foreign sectors. These two authors have used the model to study the effects of tax policies on future patterns of energy consumption. Their comment on their electricity consumption "base case" under existing conditions is revealing.

"Electricity consumption increases at a rapid rate--at 5.2 percent a year between 1975 and 2000. ... Household electricity consumption increases at an average annual rate of 6.9 percent between 1975 and 2000, with household and industrial demand increasing at an average of 5.9 percent and industrial demand at 3.8 percent. The increase in household use of electricity is the most rapid of any use of any fuel and, in this, it continues the trend that has been observed in the past. However, the projected rate of increase is slower than those observed in the past due to the more rapid increase in electricity prices, the approach to saturation of heavy electricity using appliances such as home air-conditioning, laundries, dishwashers and so on, and to the decline in the rate of new dwelling construction."

Table 1 depicts the Hudson-Jorgenson "base case" U.S. energy use projections.

Purpose of This Study

As opposed to many other empirical studies of residential electricity demand in the United States, this study has a very limited goal. Our task is to provide a model that can be used to project electricity consumption by households in certain specified service areas (e.g., cities) from 1975 to 1985 (see Table 2). These projections can be used in an extensive linear programming model concerned with coal utilization in the U.S.^{3/} The nature of the econometric model which has been selected to perform this projection task may differ considerably from that which would be desired if the task were to test a hypothesis or to examine the general characteristics of markets. Two conflicting qualities are desired in the projections model. First, it should provide a good fit or explanation of historical data which are used to estimate the parameters of the model. Second, it should be simple and contain a minimum of independent variables. This second requirement is imposed

^{2/} The nine-sector I-O model has technical coefficients which are endogenously determined as a function of prices of outputs and inputs. The second component of the model incorporates a dynamic macroeconomic system to project components of national income.

^{3/} The national Interregional Coal Analysis Model is a large-scale linear programming model intended to assist in coal development planning and analysis. Coal development has expanded considerably in the mountain states and has caused severe impacts on agriculture and rural communities. The interregional competition model can be used to systematically assess the impacts of alternative policy decisions on coal development in the United States.

The interregional competition model is described in a report by John W. Green, Western Energy: The Interregional Coal Analysis Model August, 1980, Natural Resource Economics Division, Economic Research Service, U.S. Department of Agriculture, Technical Bulletin No. 1627.

Table 1--Composition of U.S. energy use; 1970-2000 (energy flows in trillion Btu)

Fuel	Consuming Sector					Total Input
	Household/ Commercial	Indus- trial	Trans- portation	Electricity generation	Synthetic gas	
1970						
Coal	427	5,004	8	7,483	0	12,922
Petroleum	6,453	5,267	15,592	2,087	0	29,614
Natural Gas	7,108	10,162	745	4,015	0	22,029
Hydro, Nuclear	0	0	0	2,879	0	2,879
Total Input	13,988	20,433	16,345	16,464	0	67,444
Electricity	3,000	2,210	16	0	0	5,218
Synthetic Gas	0	0	0	0	0	0
Total	16,988	22,643	16,361	16,464	0	67,444
1975						
Coal	200	4,393	0	8,625	0	13,219
Petroleum	6,819	6,627	17,937	2,400	0	33,783
Natural Gas	8,415	11,102	945	4,290	0	24,753
Hydro, Nuclear	0	0	0	5,475	0	5,475
Total Input	15,435	22,122	18,882	20,790	0	77,230
Electricity	3,982	2,709	22	0	0	6,713
Synthetic Gas	0	0	0	0	0	0
Total	19,418	24,831	18,904	20,790	0	77,230
1980						
Coal	180	3,897	0	10,227	0	14,304
Petroleum	7,996	7,665	20,967	2,567	0	39,195
Natural Gas	8,515	12,778	1,003	4,505	0	26,800
Hydro, Nuclear	0	0	0	10,115	0	10,115
Total Input	16,691	24,340	21,970	27,413	0	90,414
Electricity	5,427	3,396	30	0	0	8,853
Synthetic Gas	0	0	0	0	0	0
Total	22,118	27,736	22,000	27,413	0	90,414
1985						
Coal	175	3,677	0	11,779	1,111	16,741
Petroleum	9,149	8,938	23,948	2,907	89	45,031
Natural Gas	7,499	14,690	993	4,810	0	28,022
Hydro, Nuclear	0	0	0	16,010	0	16,010
Total Input	16,822	27,304	24,942	35,536	1,199	105,804
Electricity	7,490	3,951	37	0	0	11,478
Synthetic Gas	310	379	0	0	0	690
Total	24,623	31,635	24,978	35,536	1,199	105,804
1990						
Coal	135	3,612	0	13,545	2,594	19,887
Petroleum	9,964	10,655	25,902	4,053	208	50,783
Natural Gas	6,462	15,978	1,000	5,173	0	28,612
Hydro, Nuclear	0	0	0	23,616	0	23,616
Total Input	16,561	30,245	26,902	46,387	2,802	122,897
Electricity	10,064	4,876	43	0	0	14,984
Synthetic Gas	808	988	0	0	0	1,798
Total	27,434	36,109	26,945	46,387	2,802	122,897
2000						
Coal	174	5,048	0	15,878	5,061	26,160
Petroleum	12,727	14,405	29,810	4,085	405	61,432
Natural Gas	4,742	16,632	954	6,310	0	28,639
Hydro, Nuclear	0	0	0	47,152	0	47,152
Total Input	17,643	36,085	30,764	73,425	5,466	163,383
Electricity	16,737	6,927	56	0	0	23,720
Synthetic Gas	1,638	2,002	0	0	0	3,640
Total	36,017	45,014	30,820	73,425	5,466	163,383

Source: Econometric Studies of U.S. Energy Policy, Dale W. Jorgenson, Editor, North-Holland Publishing Company, Amsterdam, 1976.

Table 2--Standard Metropolitan Areas appearing in the
residential demand analysis

ALABAMA

Birmingham

Alabama Power Company

ALASKA

None

ARIZONA

Phoenix

Salt River Power District

Tucson

Tucson Gas and Electric Co.

ARKANSAS

None

CALIFORNIA

Anaheim

City of Anaheim Light and Power

Los Angeles

L.A. Dept. of Water and Power

San Diego

San Diego Gas and Electric Co.

San Francisco

Pacific Gas and Electric Co.

San Jose

Pacific Gas and Electric Co.

COLORADO

Colorado Springs

Colo. Springs Dept. of Public Utilities

Denver

Public Service of Colorado

CONNECTICUT

Bridgeport

The United Illuminating Co.

Hartford

The Hartford Electric Light Co.

Waterbury

The Conn. Light and Power Co.

DELAWARE

Wilmington

Delmarva Power and Light Co.

DISTRICT OF COLUMBIA

Washington

Potomac Electric Power Co.

FLORIDA

Fort Lauderdale

Florida Power and Light Co.

Orlando

Orlando Utilities Commission

GEORGIA

Atlanta

Georgia Power Co.

Continued

Table 2--Continued

IDAHO

Boise City	Idaho Power Co.
------------	-----------------

ILLINOIS

Chicago	Commonwealth Edison Co.
Decatur	Illinois Power Co.
Peoria	Central Illinois Light Co.

INDIANA

Evansville	Southern Indiana Gas and Electric Co.
Fort Wayne	Indiana and Michigan Electric Co.
Indianapolis	Indianapolis Power and Light Co.
Lafayette	Public Service Co. of Indiana, Inc.
Muncie	Indiana and Michigan Electric Co.

IOWA

Des Moines	Iowa Power and Light Co.
Sioux City	Iowa Public Service Co.

KANSAS

Topeka	The Kansas Power and Light Co.
--------	--------------------------------

KENTUCKY

Lexington	Kentucky Utilities Co.
Louisville	Louisville Gas and Electric Co.
Owensboro	Owensboro Municipal Utilities

LOUISIANA

Lafayette	Lafayette Utilities System
Lake Charles	Gulf States Utilities Co.
New Orleans	New Orleans Public Service, Inc.

MAINE

Portland	Central Main Power Co.
----------	------------------------

MARYLAND

Baltimore	Baltimore Gas and Electric Co.
-----------	--------------------------------

Continued

Table 2--Continued

MASSACHUSETTS

Boston
Fall River
Pittsfield
Springfield

Boston Edison Co.
Fall River Electric Light Co.
Western Massachusetts Electric Co.
Western Massachusetts Electric Co.

MICHIGAN

Flint

Consumers Power Co.

MINNESOTA

Duluth
Minneapolis
Rochester

Minnesota Power and Light Co.
Northern States Power Co.
Rochester Dept. of Public Utilities

MISSISSIPPI

Jackson

Mississippi Power and Light Co.

MISSOURI

Columbia
Kansas City
St. Louis

Columbia Water and Light Dept.
Kansas City Power and Light Co.
Union Electric Co.

MONTANA

Billings
Great Falls

The Montana Power Co.
The Montana Power Co.

NEBRASKA

Lincoln
Omaha

Lincoln Electric System
Omaha Public Power District

NEVADA

None

NEW HAMPSHIRE

Manchester
Nashua

Public Service Co. of New Hampshire
Public Service Co. of New Hampshire

NEW JERSEY

Atlantic City
Newark

Atlantic City Electric Co.
Public Service Electric and Gas Co.

NEW MEXICO

Albuquerque

Public Service Co. of New Mexico

Continued

Table 2--Continued

NEW YORK

Binghamton
Buffalo
New York City
Rochester

New York State Electric & Gas Corp.
Niagara Mohawk Power Corp.
Consolidated Edison Co. of N.Y., Inc.
Rochester Gas and Electric Corp.

NORTH CAROLINA

Charlotte
Fayetteville
Raleigh

Duke Power Co.
Fayetteville Pub. Works Commission
Carolina Power and Light Co.

NORTH DAKOTA

Fargo

Northern States Power Co.

OHIO

Cincinnati
Cleveland
Columbus
Dayton

The Cincinnati Gas and Electric Co.
The Cleveland Electric Illuminating Co.
Columbus and Southern Ohio Electric Co.
The Dayton Power and Light Co.

OKLAHOMA

Oklahoma City

Oklahoma Gas and Electric Co.

OREGON

Portland

Portland General Electric Co.

PENNSYLVANIA

Erie
Harrisburg
Philadelphia
Pittsburg
Scranton

Pennsylvania Electric Co.
Pennsylvania Power and Light Co.
Philadelphia Electric Co.
Duquesne Light Co.
Pennsylvania Power and Light Co.

RHODE ISLAND

Providence

The Narragansett Electric Co.

SOUTH CAROLINA

Columbia
Greenville

Southern Carolina Electric and Gas Co.
Duke Power Co.

SOUTH DAKOTA

Sioux Falls

Northern States Power Co.

Continued

Table 2--Continued

TENNESSEE

Knoxville
Memphis
Nashville

Knoxville Utilities Board
Memphis Light Gas and Water Division
Nashville Electric Service

TEXAS

Dallas
El Paso
Fort Worth
Galveston
Houston
Lubbock
San Antonio

Dallas Power and Light Co.
El Paso Electric Co.
Texas Electric Service Co.
Houston Lighting and Power Co.
Houston Lighting and Power Co.
Southwestern Public Service Co.
San Antonio Public Service Board

UTAH

Salt Lake City

Utah Power and Light Co.

VERMONT

None

VIRGINIA

Norfolk
Richmond
Roanoke

Virginia Electric and Power Co.
Virginia Electric and Power Co.
Appalachian Power Co.

WASHINGTON

Seattle

Seattle Dept. of Lighting

WEST VIRGINIA

Charleston

Appalachian Power Co.

WISCONSIN

Appleton
Green Bay
Milwaukee
Racine

Wisconsin Michigan Power Co.
Wisconsin Public Service Corp.
Wisconsin Electric Power Co.
Wisconsin Electric Power Co.

WYOMING

None

because to use a model to make projections requires substituting estimated 1985 values for each independent variable into the projection equation. Each of these estimated independent variable values is subject to sampling error. Ideally, household electricity demand would only depend on a few rather stable variables such as climate or population. Unfortunately, recent history and empirical studies reveal that incomes and prices have considerable influence on electricity consumption. Forecasts cannot be expected to succeed if these important and volatile influences are ignored. Nevertheless, this study examines several types of econometric models both conceptually and empirically and when an equally good fit can be obtained with a less "realistic" model (generally a simpler model) the simpler model is selected. Reducing the number of independent variables which must be projected to 1985 should reduce the amount of sampling error in the forecasts.

Methodology and Data

In keeping with the requirements imposed by the projections goal, a single equation least-squares demand function has been selected to project household electricity consumption for 1985. The functional form of the demand equation is log-linear, that is, each of the continuous variables is subjected to a logarithmic transformation and a linear equation is estimated relating the logarithm of quantity demanded per customer to the logarithms of several continuous independent variables. Special treatment is given certain dummy variables which designate regions or states which encompass service areas. A different functional form is also applied to the climate variable, heating degree days. Details of the equation form are discussed in Chapter III.

Two separate data inputs are necessary to construct projections of household electricity consumption by city in 1985. The first data requirement is to provide a sample to statistically estimate a forecasting equation. In this case we desire to estimate a demand equation relating quantity per household to causal variables such as prices, income, climate and the like. The second data requirement is to provide estimates of the values assumed by the causal variables in 1985. In some cases, the latter requirement is very simple. For example, the appropriate measure of 1985 heating degree days in a given city is likely to be best predicted by the historical average heating degree days for that city. Projection of other independent variables, such as prices, is not as obvious. Further discussion of this problem occurs in Chapter V.

The primary sources of data used to build the econometric model include Federal Energy Regulatory Commission (FERC) reports, the Census, County and City Data Book and uncirculated data provided by the American Gas Association.^{4/} Numerous other government publications were required and these are documented in the bibliography. Sources of projections for the independent variables include price projections by the U.S. Department of Energy and population and income projections by the Department of Commerce and U.S. Department of Agriculture (OBERS). Since some of these projections are subject to considerable variation because of world events, a range of price scenarios are included to reveal the sensitivity of the forecast to world energy availability.

^{4/} The American Gas Association data are confidential.

Elasticity

Household demand for electricity in cities throughout the United States depends on the interaction of many factors. Climate, life-style, population and prices are all important determinants of demand. Simple models, formerly popular with utilities, such as the one that projects trends in the ratio of energy to population, cannot hope to track reality in recent years as prices have varied. No simple constant proportion exists by which one can multiply population to obtain aggregate future energy demand.

The accumulated evidence supports the assertion that prices are an important, though not the only, determinant of energy demand. This body of evidence is already substantial and is documented in Chapter II. Although this report asserts the importance of prices other factors cannot be neglected. The fact that buyers tend to purchase less electricity as prices rise, other things held constant, does not deny the effect of climatic differences among regions on relative consumption rates. Expectations for further increases in the volatility of prices, however, requires careful analysis of price effects. Several general conclusions can be drawn from the already accumulated evidence and these can be most succinctly stated in terms of price and income elasticities of demand.

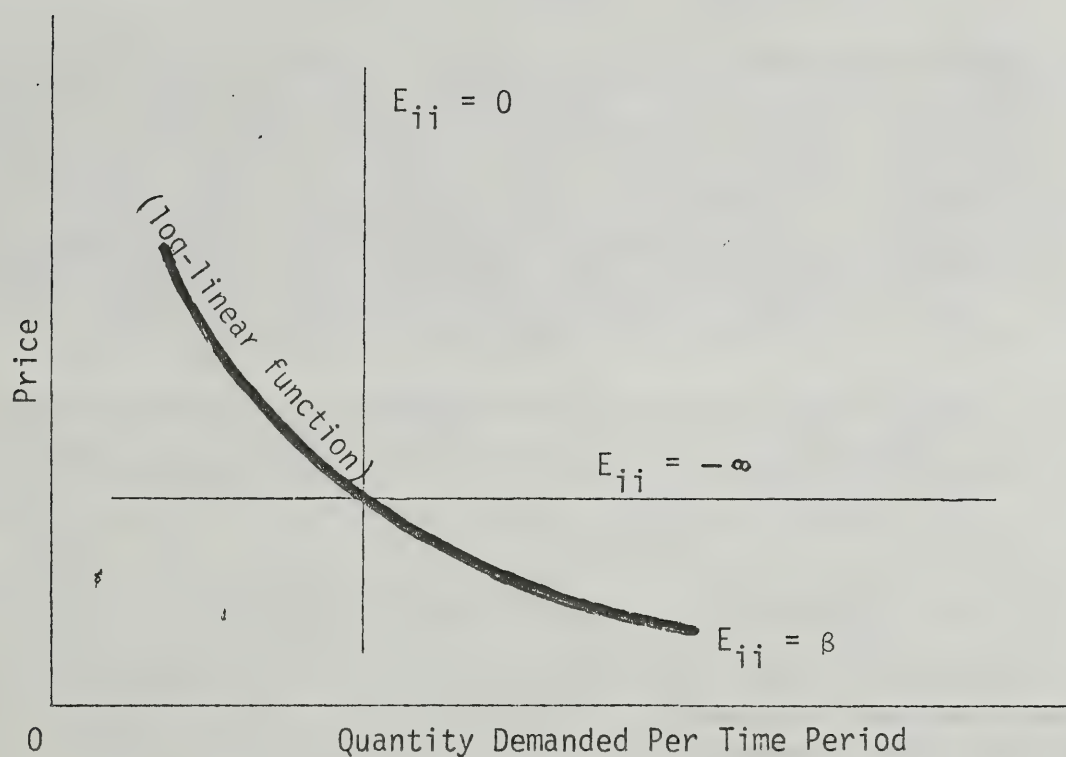
The price elasticity of demand, denoted E_{ij} , refers to the percentage change in the quantity demanded of good i in response to a one percent change in the price of good j . If i and j are the same good, for example, we might want to know how electricity sales change as electricity prices change. Then we have what is known as an "own-price elasticity." If i and j are different goods, for example, we might wish to know what effect an increase in natural gas price would have on electricity sales. Then we have what is known as a "cross elasticity." The income elasticity of demand, N_i , denotes the percentage change in demand accompanying a one percent increase in income.

Note that since the concept of elasticity is stated in terms of percentage changes in quantity demanded and percentage changes in price, the measure is independent of any units of measure. Thus, it is possible to directly compare energy studies whose various units such as Btu, kWh, gallons, tons, etc. are used without tedious conversion calculations. This convenient attribute makes elasticities the most useful available measure of demand responsiveness to price changes.

Own-price elasticities are generally the most useful magnitudes and several benchmarks exist against which to judge price responsiveness. If the elasticity coefficient is zero then demand is said to be perfectly price inelastic, that is, price has no effect on sales; if the elasticity is -1 then a 1 percent increase in price will cause quantity demanded to fall by 1 percent. In this case, demand is termed "unitary elastic." If the price elasticity of demand is between zero and -1 then demand is said to be "price inelastic." An elasticity larger than 1 in absolute value is termed "price elastic." Elasticities refer to demand curves and some of these demand curves and matching elasticities are depicted in Figure 1. The correspondence between price elasticities and economic terminology is shown below.

In the case of zero price elasticity, consumers ignore price changes and spend whatever is required to obtain desired quantities. The opposite extreme

Figure 1--Own-price elasticities and the corresponding demand curves.



Cross-elasticities and terms

<u>Cross-elasticity</u>	<u>Term</u>
$E_{ij} > 0$	Substitutes
$E_{ij} < 0$	Complements

Own-Elasticities, Terms and Effects

<u>Elasticity</u>	<u>Term</u>	<u>Change in Spending When Price Increases</u>
0	Perfectly Inelastic	Spending Rises Proportionately with Price
$0 > E_{ii} > -1$	Inelastic	Spending Rises
-1	Unitary Elastic	Spending is Constant
$-1 > E_{ii} > -\infty$	Elastic	Spending Declines
$-\infty$	Perfectly Elastic	Spending Approaches Zero

is shown by perfect price elasticity where a very small rise in price is sufficient to cause consumers to substitute other fuels in place of electricity. Neither extreme is appropriate to describe household electricity demand.

Only negative own-elasticities have been considered because economic theory suggests that, as prices rise, quantity sold falls (other things held constant). If $E_{ii} > 0$, the response can be said to be perverse.

While own-elasticities should always be negative, cross-elasticities can take on any value. If a cross-elasticity is positive the two goods can be said to be substitutes. For example, electricity and natural gas are substitutes if, as the price of electricity increases, the demand for natural gas increases.^{5/} If two goods are complements it follows that $E_{ij} < 0$.

Energy inputs differ from many other consumer goods because demand elasticities differ between the short run and the long run. Energy is a product which is not consumed directly. For example, space heat is the product the consumer enjoys rather than electricity. Because electricity is an intermediate good, it is consumed in conjunction with other inputs including capital stocks. For the consumer, this means refrigerators and stoves and other appliances. As long as a given capital stock remains in place, the possibility of substitution is limited due to the technical features of the refrigerators, stoves, or machines. Each piece of capital requires a given fuel type and has fixed efficiency. Therefore, in the short run, substitution of cheaper fuel types is difficult though not always impossible. Thus, household energy demands are generally inelastic in the short run and more elastic in the long run.

In his comprehensive survey of demand price elasticities for energy Edmonds (30) concludes

"While agreement is unanimous that elasticities are nonzero, and correct (negative) in sign, no agreement exists with regard to their actual numerical values. Estimates sometimes diverge by an entire order of magnitude. ... At the writing of this paper, economists still search for the perfect model, data base, and R^2 and the funding to make it all possible."

Chapter II contains a comprehensive survey of price and income elasticity estimates for household electricity consumption. The truth of Edmond's assertion is borne out in that review.

^{5/}This statement refers only to the consumer demand market where electricity and natural gas compete to produce an output like space heat. The statement is not likely to be true in a supply market where natural gas is a fuel used in the production of electricity. In the latter market the demand for natural gas may fall as the price of electricity increases.

CHAPTER II. SURVEY OF PREVIOUS WORK

Conceptual Issues

Existing studies of residential electricity demand are extremely heterogeneous in the structuring of their models and in their research findings. All studies agree that prices are important in projecting future sales of electricity. Differing methodologies employed, reflecting differing assumptions concerning the appropriate way to describe the behavior of purchasers and sellers of electricity, result in quite different estimates of the effects of price changes on quantity sold.^{6/}

In the process of replicating some of the existing studies using our improved data set, new insights suggest certain modifications in the structuring of model specifications. Also, combining the ideas of previous researchers has resulted in new models to be investigated.

We have determined empirically that long-run electricity demand projections should consider changes in household share of appliances powered by electricity. However, our test of this hypothesis depends on a single year (1960) of historical substitute fuel price data used in conjunction with 1975 data. A complete and accurate statistical analysis of the lagged and cumulative effects of historical fuel prices on current and future electric appliance stock should be possible using the retail energy price data for alternative fuels by city which have been supplied to us by the American Gas Association. Unfortunately, the confidential data were received too late to undertake a dynamic modeling effort in this study.

Several controversies concerning the specification of the model exist among researchers doing research on electrical demand. Some of the most important issues are described below.

Marginal versus average price. Early researchers (including several well-known econometricians) argued that consumers are unaware of block rate prices and, therefore, it was appropriate to use average price as an indicator of the total costs associated with electricity use. More recently, prestigious research organizations, such as the Electric Power Research Institute (EPRI) (95), have published models using marginal prices. Many electric utility officials remain skeptical of marginal prices as a determinant of consumer behavior.

Simultaneity. Some researchers have argued for a simultaneous supply and demand model while others have either ignored or minimized the importance of a two-equation model. Most recently, EPRI contractors^{7/} have developed a model which attempts to take account of the simultaneous nature of the electricity market by picking the prices associated with various quantities

^{6/} Contrary to past history, electricity prices are expected to be among the more volatile determinants of electricity sales in the future.

^{7/} Taylor, et. al., see tables II-1 and II-2 and the references following the tables.

sold off the utility rate schedules. Unfortunately, this technique fails to recognize the fact that rate schedules vary systematically among regions as a function of output and that this variation is an important component in the total explanation of the electricity market, i.e., to take rate schedules as being given and fixed is to ignore the supply and cost factors underlying them. This will be discussed in detail later in this report.

Historical fuel prices. A third difference among researchers results from the fact that while the discussion of appliance stocks abounds in the literature, little has been done to assess the effects of past fuel prices on the present and future shares of electric appliances. The recent EPRI study (96) is one of the few to use this approach but they are forced to rely on distributed-lag-model techniques due to their limited historical data set and the very weak price data used for alternative fuels. Their research and ours, even with the limited data processed so far from the AGA, shows the importance of analyzing the influence of past prices of electricity and substitute fuels on the share of electrical appliances. Shifts in the appliance fuel mix is the primary way in which changes in relative fuel prices is translated into changes in quantity demanded.

Simultaneity

Several investigators into the demand for residential electricity have noted that the use of ex-post average price (total receipts divided by the quantity sold) not only ignores the marginal pricing structure which the consumer faces but also neglects to account for the simultaneity of supply and demand. Discussions of simultaneity, however, show a lack of agreement among researchers as to the causes of, and solution for, the simultaneity problem. Several investigators utilize ex-ante rate schedules in some manner to pick off the prices charged for various amounts of electricity thus claiming to have eliminated the simultaneity problem. A few investigators attempt,^{8/} with little success, to include a supply function based upon factors which presumably would affect costs of production. Neither approach seems to result in markedly different price elasticity estimates. This may be attributable to a deficiency in the structural models estimated and inadequate data. A more accurate depiction of the market for residential electricity may include a number of ingredients not found in existing studies.^{9/} The simultaneity which exists in the electricity market is made more complicated because of the existence of utility pricing schemes which usually amount to some form of decreasing rate structure (this is historically true). Most researchers have assumed that rate schedules are autonomously imposed by utilities and regulatory agencies without regard to demand or cost.^{10/} If this assumption were true it would be possible to treat prices shown by actual rate schedules as exogenous. Unfortunately, this technique is not sufficient. In order to identify demand, the residential electricity demand model must take account of factors which affect cost and efficiency if (as seems extremely likely) the

^{8/} See Table 3. Halvorsen, Levy, Asbury, and Griffin attempted two stage least squares estimation of simultaneous equation models.

^{9/} One ingredient concerns the use of appliance stocks in a manner appropriate to measure the total sensitivity of quantity sold to electricity price. This case will be discussed later.

^{10/} For example, Chern states, "Simultaneity exists in an average price model because, with declining block rates, the average price depends on the quantity consumed even though rates are determined exogenously" (20).

cost-efficiency factors are related to output (65). By using only the given rate schedules to find average and/or marginal prices researchers have ignored the influence of the cost-output relation on the setting of rates. Utilities are not subsidized and thus are constrained to set prices so that receipts cover costs. If costs are a function of output then simply picking prices from given rate schedules fails to account for the influence of output on cost efficiency and therefore on the average price required to cover costs. Omitting the output-cost effects on the selection of a rate schedule may tend to falsely attribute to price elasticity of demand those effects caused by cost-efficiency changes due to changing output levels.

To assume that rate schedules are set autonomously without regard to production costs is to disregard the basic cost-output relationship conventionally used in the supply component of supply-demand analysis. While it is true that some characteristics of the rate schedule could be set autonomously, it is also true that utility districts need to cover costs of operation from receipts. This implies that, while the nature of the rate schedule (such as declining block rates) can be autonomously set, the average price must be a function of output if cost-efficiency is a function of output. For example, a utility and its regulators could choose to make a rate schedule decline more rapidly but they might have to simultaneously shift the schedule upward in order to continue to cover costs of production (depending on the elasticity of demand and on whether steepening the rate schedule increased the discriminatory pricing extraction of consumer surplus) (Figure 2).

An estimation technique which allows for the discretionary power of utilities to set the height and slope of rate schedules, but which takes account of supply (cost efficiency as a function of output) factors determining the required average price (to cover costs for a given output level), has not been achieved. One possibility might be to use the technique of picking marginal prices from ex-ante rate schedules and also estimating, via a simultaneous model, the average price as required by supply considerations. Both the exogenously determined ex-ante marginal price and the simultaneously determined average price would be included when estimating the simultaneous model. As far as we are aware, no such technique has ever been attempted or even suggested.

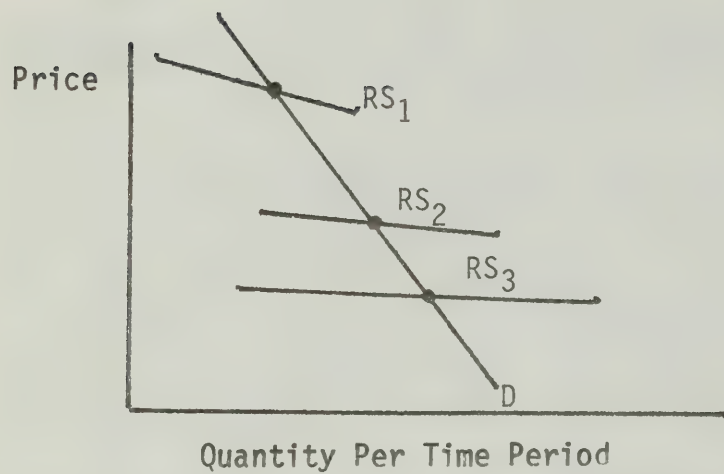
Long-Run Demand

The second ingredient which we feel is necessary to accurately describe the residential electricity market concerns appliance stocks. Several authors (Taylor, for example) have argued that the demand for appliance stocks is the long-run demand for electricity. As noted by Cooper(27), this argument is incorrect. To say that the factors which determine appliance stocks totally measure the sensitivity of electricity sales to price changes is to assume implicitly that appliance stocks must be used at a constant rate. Historical data refute this assumption.

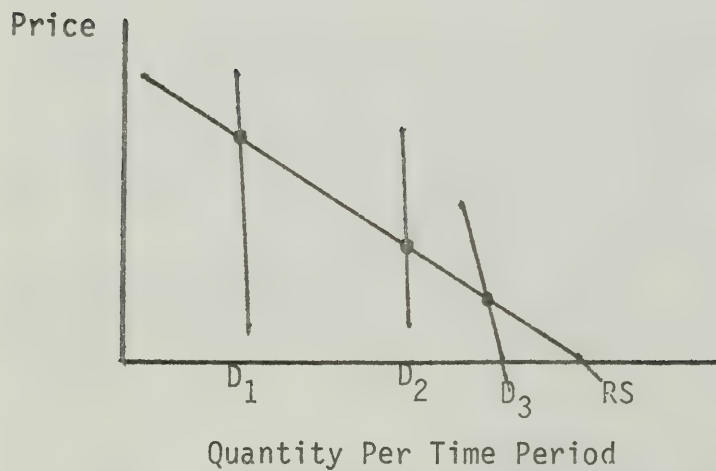
Electricity sales are determined both by saturation levels of electric appliance ownership and by the rate of utilization of these appliances. A pure appliance stock model which explains only electric appliance ownership saturation levels neglects the effect of prices on rates of utilization. Surely, as prices of electricity rise, a potential consumer may desire to

Figure 2--The identification problem for residential electricity demand

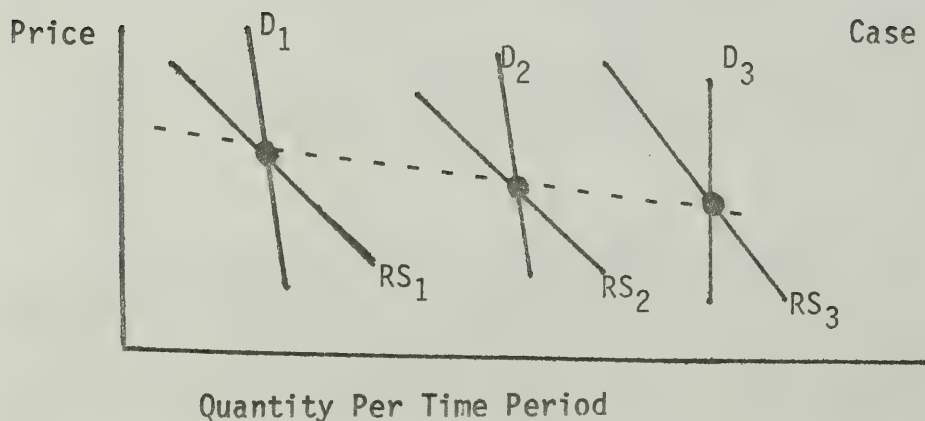
(Assume the observational unit is the electric utility)



Case 1: Demand is traced when the rate schedule fluctuates more than demand.



Case 2: Rate Schedule is traced when demand fluctuates more than the rate schedule.



Case 3: Mongrel Equation is traced when both the rate schedule and demand fluctuate.

maintain ownership of certain electric appliances and use them less. Electric heat might be supplemented by more insulation and greater use of a wood burning fireplace or stove. Cooler water might be used in the washer and for other household purposes thus reducing the utilization rate of electric water heaters. Many other examples could be made to demonstrate this point.

The Almon Lag Technique

One of the earlier investigators of residential electricity demand (35) reject a stock adjustment model (distributed lag) for use in explaining the demand for appliances.

"...our analysis is concerned with the stock of certain physical units; units moreover, which have the property that a given household generally owns one of them at the most. Net changes in that stock, therefore, come about overwhelmingly by the purchase of new units by households not previously owning one. While it is true...that the demonstration effects of other household's possessions may influence such purchases, it is unreasonable to use a model which makes such purchases proportional to the difference between desired and actual stock. The actual stock that counts here is zero and the fact that other households in the economic aggregate being considered own the good already is not relevant in this place."

The Fisher-Kaysen argument against a stock adjustment model (Koyck model) to predict appliances certainly seems convincing. However, the stock adjustment rationale is only one of several models leading to a flow adjustment, distributed lag formulation. We suggest that appliance stocks may be purchased on the basis of an expectations model leading to a distributed lag effect. Assume that (among other things) the stock of electric appliances is based upon the expected price for electricity vis-a-vis other fuels (for appliances where other fuels are feasible). Expected prices are not observable directly but a second equation which formulates how price expectations are formed in relation to actual historical prices can also be hypothesized. Either the Nerlove model of expectations (described elsewhere) or a simple assumption that expected price is based upon a geometrically declining weighted average of past prices^{11/} will result in a distributed lag model.

One of our exploratory investigations on electric appliance demand utilized the "short-cut" distributed lag model in which lagged values of appliance stocks are used to explain current stocks. At the time of this study, the complete historical data set had not been received from AGA and only 1960 appliance stocks data were available with which to form a distributed lag model to predict 1970 electric appliance saturation. Future modeling could include weighted averages of alternative fuel prices and electric fuel prices from 1960 to 1975 as predictors of current electric appliance saturation, i.e., the Almon distributed-lag method which reduces problems associated with serial correlation. Expected prices are incorporated directly into the model in place of the "short-cut" technique which utilized previous saturation rates.

^{11/} This weighting scheme is required in order to achieve a reduced form equation containing observable variables if the "short-cut" technique (where the dependent variable is regressed on its previous value) is used. The shortcomings of this technique are discussed at length in a later chapter.

Previous Major Findings

The salient features of 20 studies conducted between 1962 and 1977 are presented in Table 3 and Table 4. Table 3 shows the estimated price elasticity, data type, and estimation method while Table 4 shows the cross-elasticity to natural gas, the income elasticity, and describes the variables used in the model.

The difference between the price elasticity estimates arises partly because electrical prices are defined differently between studies. Studies 1, 2, 4, 6, 7, 8, 10, 14, 16, 17, 18, and 19 use an average price of electricity defined as revenue per kWh. Studies 3, 5, and 13 use marginal prices defined as the FERC's typical bill for a certain number of kilowatt hours per period. Study 20 uses actual rate schedules to determine marginal prices. Study 9 uses the implicit price deflator for electricity estimated by the U.S. Department of Commerce.

There are conceptual difficulties associated with using either an average or a marginal price in the demand function. The problem with using average price in the demand function is that average price includes demand in its definition. Studies 6, 7, 10, 12, and 16 attempt to get around this problem by simultaneously estimating price and quantity demanded. In studies 6 and 16 two average specifications for the price equations are tried, one with average price determined by cost variables (fuels, etc.) and the other with price explained by typical electric bills at three levels of usage. It is interesting to note that similar price elasticity estimates are obtained with both methods. The problem with including only the marginal price in the demand function is that the price elasticity will change if customers jump to new rate schedules over the period in which the price elasticities are estimated. It can be shown that using only a marginal tariff rate can produce an upward bias in the price elasticity estimate. Study 13 attempts to circumvent this problem by estimating three different demand functions, each using a marginal price for a different rate class. Taylor argues that both average and marginal prices should be included in the demand function but that actual rate schedules rather than ex post schedules should be used (95).^{12/} It does not appear that the theory of price determination in electricity

^{12/} If Taylor is correct, the analysis of underspecification in Chapter III will show the bias in the elasticity estimate. Let P_m stand for marginal price and P_a stand for average price. The primes on each variable indicate a logarithmic transformation. If the true relation is

$$Q'_i = \beta_1 + \beta_2 P'_{m_i} + \beta_3 P'_{a_i} + U_i$$

and P'_{a_i} is excluded, then the estimate for β_2 will be

$$\hat{\beta}_2 = \beta_2 + \beta_3 \frac{\text{Cov}(P_m P_a)}{\text{Var}(P_m)}$$

where $\beta_2 < 0$, $\beta_3 < 0$, $\text{Var}_\wedge(P_m) > 0$ and, with declining rate schedules, $\text{Covar}(P_m P_a) > 0$. Thus $\hat{\beta}_2$ is more strongly negative than is the true elasticity with respect to marginal price (β_2).

Table 3--Selected estimates of long-run price elasticity
of residential electricity demand*

Authors and Date**	Price Elasticity	Data Type and Estimation Technique
1. Fisher-Kaysen, 1962	-0.22 to -0.55	1946-49 and 1951-57 pooled cross section and time series of states.
2. Houthakker-Taylor, 1970	-1.89	1947-64 time series, a state adjustment model, ordinary least squares technique
3. Wilson, 1971	-1.33	1966 cross section of states, ordinary least squares technique
4. Anderson, 1972	-0.91 and -0.85	1969 cross section of 77 cities, ordinary least squares technique
5. Halverson, 1973	-1.12	1969 and 1970 cross section of states, ordinary least squares technique (also tries appliance stock demand elasticity -.84)
6. Halverson, 1973	-1.00	1969 cross section of states, ordinary least squares, similar results with 2SLS technique (supply variables generally not significant)
7. Levy, 1973	-1.12	1970 cross section of 67 utilities in New England, 2SLS, similar results from ordinary least squares technique
8. Mount, 1973, with Chapman and Tyrrell	-1.20	1947-70 pooled cross section and time series of states, variable elasticity (by state) geometric lag model, ordinary least squares, similar results with instrumental variables technique
9. Verleger, 1973	-0.55	Time-series, ordinary least squares, includes commercial customers
10. Asbury, 1974	1959, -0.93 1965, -0.97 1968-. -1.03	1959, 1965, and 1970 cross-section of states, ordinary least squares technique and 2SLS (elasticity -0.88 to -1.14)

Continued

Table 3--Continued.

	Authors and Date	Price Elasticity	Data Type and Estimation Technique
11.	Gill, 1974, with Chern, Ellison, and Tyrrell	-0.85	1962-1972 pooled cross section and time series of distributors in TVA, geometric lag model, generalized least squares technique
12.	Griffin, 1974	-0.52	1970 U.S. time series data, Almon polynomial distributed lag model, 2SLS technique, multiequation model
13.	Houthakker, 1974, with Verleger and Sheehan	100-250kWh, -1.2 200-500kWh, -1.02 250-500kWh, -0.44	1961-71 pooled cross section and time series of states, flow adjustment model, generalized least squares technique
14.	Randall, 1974, with Ives and Ryan	-1.06	1970 cross section, Southwest U.S., ordinary least squares technique
15.	Gill, 1975, with Tyrrell, Ellison, Chern, Haynes, and Kaplan	-1.15	See Gill above
16.	Halvorsen, 1975	-1.15	1961-69 pooled cross section and time series of states, 2SLS technique
17.	Lyman, 1975	West coast -1.02 Northwest -1.15 N. Midwest -0.13 Midwest -1.05 MidAtlantic -0.82 S. West -1.17 N. Texas -1.13 S. Texas -0.58 South -1.36 Florida & Gulf -0.19	1959-68, pooled cross section and time series separated into 10 regions, data on 67 utilities, author says price elasticity estimates lie between the short run and the long run
18.	Uri, 1975	-1.92	1947-70 pooled cross section and time series of states, variable elasticity geometric lag model, ordinary least squares technique

Continued

Table 3--Continued.

Authors and Date	Price Elasticity	Data Type and Estimation Technique
19. Hassan, 1977, with Johnson and Green	Uncompensated Model <u>Rotterdam</u> -- -0.74 <u>Linear</u> -- -0.86 <u>Log-Log</u> -- -0.91 Compensated Model <u>Rotterdam</u> -- -0.54 <u>Linear</u> -- -0.62 <u>Log-Log</u> -- -0.79 <u>State Adjustment Model</u> -0.76 <u>Dynamic Linear Expenditure Model</u> Uncompensated -0.62 Compensated -0.37	1947-72 Canadian time series data, demand for rent, fuel, and elec- tric power
20. Taylor, 1977, with Blattenberger and Verleger	<u>Log-Log Flow Adjustment Model</u> -0.82 <u>Linear Flow Adjustment Model</u> -6.21 <u>Log-Log Koyck Dis- tributed Lag Model</u> -0.81 <u>Linear Koyck Dis- tributed Lag Model</u> -3.68 <u>Appliance Stock Model</u> -0.46 to -0.90	1956-72 pooled cross section and time series of states, the author declares the larger elasticity estimates "Implausible," however, the R^2 is .99 for <u>all</u> distri- buted lag models, estimated by by variance components technique
21. Yang, 1978	-0.57 to -1.119	1962-75 pooled cross section and time series of states, comparisons of cross sections for different periods are made.
22. Uri, 1977	-.35	Log-linear flow adjustment model money illusion is assumed so that deflation is not attempted, Zellner's seemingly unrelated re- gression method is used on ag- gregate U.S. time series data from 1971-1976

*Nominally Presented by the Authors as Long Run

**One of the earliest comparable studies is by Houthakker in 1951. He finds a price elasticity with fixed stocks of appliances of -.89. His data are cross section for 42 British towns in 1937 and 1938.

Table 4--Selected estimates of long-run elasticity of natural gas price and income*

Authors	Cross Elasticity with Natural Gas	Income Elasticity	Dependent Variable and Other Variables in the Model
1. Fisher-Kaysen			Appliance stocks; income population, number of wired households (uses average revenues for price)
2. Houthakker-Taylor	0.00	1.93	Per capita consumption (uses average revenues for price)
3. Wilson	0.31	-0.46	KWh/household, house size, degree days (uses TEB 500 kWh for price)
4. Anderson	0.13 & 0.21	1.13 & 0.94	Appliance fuel choice; demographic and climatic variables (hard to interpret since not tied to electricity sales)
5. Anderson	0.30	0.80	KWh/household; (alternate fuel prices and climatic variables play minor roles) (uses TEB 500 to 1,000 kWh for price)
6. Halverson	0.16	0.70	Avg. use and average revenue (simultaneous); income, climate, demographic variables, alternate fuel prices.
7. Levy	-0.31	0.44	Similar to Halverson's study. Uses utility service areas in place of state data, price, income, utility ownership, family size
8. Mount, Chapman, and Tyrrell	0.19	0.20	Total kWh consumption; per capita income, gas and appliance prices, population, regional dummies (Average revenues for price)
9. Verleger	Not estimated		KWh/capita; price data is the implicit price deflator for electricity

Continued

Table 4--Continued

Authors	Cross Elasticity with Natural Gas	Income Elasticity	Dependent Variable and Other Variables in the Model
10. Asbury	1959, 0.19 1965, 0.14 1970, 0.17	0.43 0.40 0.18	Population density (Average revenues for price)
11. Gill, Chern, Ellison, & Tyrrell	0.66	0.25	Total kWh consumption, number of customers, appliance prices
12. Griffin	Not estimated	0.88	KWh/capita, stocks of electricity consuming equip- ment; (part of a 25-equation macroeconomic model) (appliance stocks not related to elec- tricity price)
13. Houthakker, Verleger, & Sheehan	Not estimated	100-250kWh, 1.60 200-500kWh, 1.64 250-500kWh, 2.20	KWh/capita (marginal prices using TEB data)
14. Randall, Ives, & Ryan	0.25	0.27	Total kWh consumption, number of customers (uses aver- age price)
15. Gill, Tyrrell, Ellison, Haynes, & Kaplan	0.53	0.23	See Gill above.
16. Halvorsen	0.04	0.51	KWh/household; % rural population, household size (cost variables in supply curve)
17. Lyman	West coast 0.33 Northwest -0.28 N. Midwest 0.36 Midwest 0.03 MidAtlantic 0.04 S. West -0.02 N. Texas 0.29 S. Texas -1.27 South -0.80 Florida & Gulf 0.49	0.17 0.55 0.24 0.35 0.30 0.08 -2.07 -2.14 -0.54 0.11	KWh/customer; index of other prices, after tax income/number of households, mean household size, median household income and propor- tion of households by income range, average temperature, average degree days, average relative humidity, variation in climate variables, number of customers in utility service area, population density, cities/land area interaction terms (uses average revenue for price)

Continued

Table 4--Continued

Authors	Cross Elasticity with Natural Gas	Income Elasticity	Dependent Variable and Other Variables in the Model
18. Uri	0.42		Total kWh consumption (uses average revenue for price)
19. Hassan, Johnson, & Green	Not estimated	Rotterdam model 1.04 Linear model 1.30 Log-Log model 0.65	Per capita, spending for rent, fuel, and electric power (quantity per capita in some models)
20. Taylor	0.00	<u>Log-Log Flow Adjustment Model</u> 1.08	KWh/customer, (Marginal prices using ex-ante rate schedules.)
	0.00	<u>Linear Flow Adjustment Model</u> 8.56	
	0.00	<u>Log-Log Koyck Distributed Lag Model</u> 1.05	
	0.00	<u>Linear Koyck Distributed Lag Model</u> 3.84	
	0.00	<u>Appliance Stock Model</u> 1.0 to 1.36	
21. Yang	.05 to .158	-.277 to .128	Average per capita quantity of electricity, marginal electricity price for 250-500 kWh from <u>Typical Electric Bills</u> , average gas prices from <u>Gas Facts</u> , average per capita income. All monetary data are deflated. Average electri- city price is also included

Continued

Table 4--Continued

Authors	Cross Elasticity with Natural Gas	Income Elasticity	Dependent Variable and Other Variables in the Model
22. Uri	Not estimated	2.00	Monthly sales per customer; average electricity price, monthly average of average weekly earnings, heating degree days, oil-embargo dummy variable.

*Nominally Presented by the Authors as Long Run

demand has been adequately worked out. It may be that these theoretical problems are not very important when applied to a broad aggregate of electric utility customers.

Methodological differences among the studies also produce variations in the short run (SR) and long run (LR) price elasticity estimates. Differences between SR and LR elasticity estimates are explained in part by the factors discussed above but also by the fact that different distributed lags are used. For those studies that utilize either time series or time series and pooled cross section data studies (1, 2, 8, 9, 11, 12, 13, 15, 16, 17, 18, and 19) LR price elasticities are derived functionally from the SR elasticities and the distributed lag-parameter estimates. The most common method for estimating the distributed lag coefficients is to use the Koyck transformation which assumes a geometrically declining set of weights in the lag distribution. An example of the Koyck distributed lag is given by

$$DE'_{it} = \hat{\beta}_0 + \hat{\beta}_1 \bar{X}'_{it} + \hat{\beta}_2 PE'_{it} + \hat{\beta}_3 DE'_{it-1} \quad (1)$$

where DE_{it} = electric power demand per customer in the i th economic sector in period t ,

\bar{X}_{it} = all variables other than the price of electricity that explain the demand for electric power (e.g., per capita income, price of gas, etc.),

PE_{it} = price of electricity, and

$\hat{\beta}_0, \hat{\beta}_1, \hat{\beta}_2, \hat{\beta}_3$ = parameter estimates.

The primes in equation (1) indicate that all variables are measured in logarithms so the parameter estimate $\hat{\beta}_2$ is a direct measure of short run price elasticity. To obtain the long-run price elasticity, we set $DE'_{it-1} = DE'_{it}$ ^{13/} and resolve for DE'_{it} thus obtaining the LR demand equation

$$DE'_{it} = \bar{\beta}_0 + \bar{\beta}_1 X'_{it} + \bar{\beta}_2 PE'_{it} + E'_{it} \quad (2)$$

The LR price elasticity estimate is then given as

$$\bar{\beta}_2 = \frac{\hat{\beta}_2}{1 - \hat{\beta}_3}$$

^{13/} Quantity demanded is assumed constant when market equilibrium is reached, thus

where $\hat{\beta}_3$ is the distributed lag coefficient estimate. Studies 8, 9, 13, and 16 estimate the distributed lag using the "short cut" technique described above.

Although the Koyck method of estimating the distributed lag is the most common method used (largely because of its small data requirements) it is well known in the econometric literature that there are severe methodological problems associated with the technique. First, the geometric lag imposes exactly the same unrealistic distributed lag on all the independent variables in the equation. Second, if the random disturbances are autocorrelated bias results in the estimated distributed lag coefficient. Study 12 attempts to get around these problems by using the Almon polynomial distributed lag procedure. The basic idea of this method is that the lag distribution can be expressed as a fairly low order polynomial function of the lag itself. Thus, if the distributed lag model is written as

$$DE'_{it} = \beta_0 + \beta_1 X'_{it} + \beta_2 \sum_{n=0}^P W_t PE'_{it-n} + E'_{it} \quad (3)$$

and

$$W_t = \alpha_1 + \alpha_2 t + \alpha_3 t^2 \dots + \alpha_s t^{s-1} \quad (4)$$

then the distributed lag in equation (4) can be rewritten as weighted averages of PE_{it-n} . The Almon lag places fewer constraints on the lag structure than the Koyck method and eliminates the autocorrelation bias problem. Study 12 uses the Almon lag in estimating power demand and has considerably lower SR and LR price elasticity estimates than study 8 which uses the Koyck lag distribution. On the other hand study 9, which also uses the Koyck lag distribution, produces SR and LR estimates similar in magnitude to those found in study 12.

Time Series Versus Cross Section Estimates

Over three-fifths of previous studies are either time series or pooled cross section and time series. The pooled and pure time series models invariably use the distributed lag technique to model the demand function. The adoption of a distributed lag technique allows the use of short run time series data to estimate both short run and longer run price elasticities. Long run elasticities are appropriate if long term predictions of electricity usage are desired. The time series and combination cross section and time series data sets (pooled) also incorporate distributed lag relationships in order to remove serial correlation (which can reduce efficiency and which violates the assumptions that the observations are independent). Unfortunately, the use of time series data presents several problems including contemporaneous trends in several of the variables (notably, prices and quantities as well as income and population). It is impossible to say to what degree the relation among these variables might be spurious (each one increasing due to exogenous influences) rather than reflecting a true interdependence. The distributed lag technique is an attempt to adjust for this but, unfortunately, tests used to show that serial correlation has been removed are not effective when the "short cut"

technique is used to generate the estimated equation. Thus, time series data present some insoluble problems. Improper specification of the model can result in bias in the elasticity estimates. These problems severely restrict the usefulness of increasing the sample size through the incorporation of time series in combination with cross section data.

Time series data also suffers from collinearity since most all nominal "independent" variables contain trends which makes them correlate highly to each other. This means that, statistically, any one variable explains for all, but, in fact, many causal variables exist and it is simply the existence of trend which prevents the proper inclusion of the appropriate independent variables. Cross section analysis avoids the problem of contemporaneous trends although some collinearity may still exist.

It is interesting to note in Table 5 that the price elasticity estimates found in the studies using cross section data all lie very closely around -1.0. In contrast, the studies which utilize time series data show a very wide variation (from nearly zero to -6.21) in price elasticity. Time series studies also have a wide variation among their income elasticity and cross elasticity estimates.

Table 5--Comparison of cross section and time series price
elasticity estimates

<u>Cross Section Estimates</u>	
<u>Source*</u>	<u>Price Elasticity</u>
(3)	-1.33
(4)	-0.91 and -0.85
(5)	-1.12
(6)	-1.00
(7)	-1.12
(10)	-0.93, -0.97, and -1.03
(14)	-1.06
(21)	-1.19
(22)	-0.35
<u>Time Series Estimates</u>	
(1)	-0.22 to -0.55
(2)	-1.89
(8)	-1.20
(9)	-0.55
(11)	-0.85
(12)	-0.52
(13)	-0.44 to -1.2
(15)	-1.15
(16)	-1.15
(17)	-0.58 to -1.36
(18)	-1.92
(19)	-0.37 to -0.91
(20)	-0.46 to -6.21

*Authors are referenced in Tables 3 and 4.

CHAPTER III. RESEARCH METHODOLOGY

In this section we discuss the selection of data, variables, functional form and model structure used in this research effort.

The Single Equation Model

Three alternatives exist to define the data included in the sample used to estimate the forecasting equation for household electricity consumption. These are the pure time series sample, the pure cross section sample, and the pooled cross section and time series sample. Many of the studies described in Chapter Two were of the pooled time series and cross section variety. For the purposes of this study it was decided to avoid the use of time series data altogether. In principle, time series data afford the opportunity to estimate dynamic relationships which measure the speed of reactions such as might be shown by the time path of household electricity sales determined by rapid changes in prices. Unfortunately, the ability of statistical models to reveal true relationships depends partly on prior knowledge of relationships. Very little is known about dynamic adjustments in most economic or market situations and less is known about the dynamics of residential electricity consumption.^{14/} Estimation of a hypothesized dynamic model from time series data could serve a useful purpose in enlarging our understanding of the market but it would be deceptive to declare that such a model was more than "exploratory" testing. We have indeed engaged in some "exploratory" testing and it is reported in the appendix. For the purposes of a forecast it was decided to utilize the relatively simple cross section sample which is more consistent with the usual comparative static microeconomic framework of analysis, i.e., weekly or monthly changes are not predicted but rather "long run" adjustments in 1975 are estimated.^{15/} ^{16/}

^{14/} Several other comments on the use of time series data are necessary. Most economic data contain time trends, and time series analysis is always plagued with the question of whether true causation is shown by time series regressions or whether simple correlation of trends is involved. Spurious correlation of trends may account for the fact that high correlations are almost assured when time series data is used. Adjustment to remove serial correlation, when done mechanically, may "throw out the baby with the bath water" while adjustments based on prior knowledge of the dynamic properties of the market are impossible given our limited knowledge. Serial correlation, common in market data also results in overstatements of the goodness of fit calculated by the usual multiple regression techniques which assume that no serial correlation exists.

^{15/} Under the assumption that both appliance stocks and rates of use are at equilibrium levels in each regional observation rationing or abrupt price changes would invalidate more recent cross section data.

^{16/} Many of the previous studies have selected the distributed lag technique (using the data saving "short cut" technique where the dependent variable in time period t is regressed on the value of the dependent variable in time period $t-1$) and thus it is necessary to explain briefly why this approach was discarded.

Several alternative explanations of consumer behavior are consistent with the ubiquitous "short cut" version of the distributed lag model. Thus the model is not powerful in discriminating among alternative hypotheses but very often provides a "good" statistical fit to the data. The "short cut" version is popular among economists because it allows estimation of the lagged effects of causal variables on electricity consumption without requiring measurement of the lagged observations on the causal variables. Unfortunately, the requirement for geometrically declining weights on past values of causal variables (implied by the structure of the model) may not be appropriate to explain household electricity demand. Also, the lack of power to distinguish among alternative explanations of consumer behavior makes the technique more one of pragmatic estimation than one of hypothesis testing. Despite its acknowledged statistical weaknesses ^{17/} the technique is currently used by many who seek to explain the behavior of household consumers of electricity.

The following discussion shows three rationalizations which are consistent with the geometrically declining weights in the distributed lag model. It should be kept in mind that these comments and later discussion pertain only to the "short cut" data saving model which replaces actual lagged observations on causal variables with the lagged observation on the dependent variable. A model in which past values of the causal variables are included does not suffer any restriction concerning weights applied to past values since the weights can be determined by the regression itself. A paucity of historical data may partly account for the lack of use of the less restrictive model incorporating actual lagged values of the independent variables.

A special form of distributed lag with geometrically declining weights is often used to estimate long run demand for electricity. This form can be used to measure the lagged effects of prices or income on current electricity consumption without actual lagged data for the causal variables. Let EC_t stand for current electricity consumption. The distributed lag reduced form is

$$EC_t = \beta(EC_{t-1}) + \sum_{j=1}^n C_j (X_{tj}) + e_t \quad (5)$$

where X can be measures of electricity price, prices of closely related goods, income or other causal variables. This type of distributed lag model can be interpreted in several ways. Koyck (69) has shown that, given a geometric lag distribution (simplified by including only one exogenous variable summed over i time periods), i.e.

$$EC_t = \alpha \sum_{i=0}^{\infty} (1-v)v^i X_{t-i} + u_t \quad (6)$$

^{17/} Inclusion of a lagged value of the dependent variable as an explanatory variable causes added statistical difficulties; this will be discussed later.

that an equivalent algebraic expression to equation 6 is

$$EC_t = v EC_{t-1} + \alpha(1-v)X_t + v u_t - u_{t-1} \quad (7)$$

Since equation 7 is operationally equivalent to equation 5 the Koyck interpretation of 5 can be expressed by equation 6. That is, electricity consumption would be based on past and current values of the causal variables with past values declining in importance by geometric progression.

A second interpretation is provided by Cagan (16) in which consumption would be based on expected values of the independent variables. Since expectations cannot be measured directly an adaptive adjustment relation is assumed. Current expectations for prices or income are revised in each period by some fraction, k' , of the difference between previous expected values and actual values. The coefficient, k' , is often required to fall in the range 0 to 1 since this implies that the adjustment in expectations will not exceed the error in the previous forecast. The Cagan model can be summarized as

$$EC_t = b X_t^* + U_t \quad (8)$$

and

$$X_{t+1}^* - X_t^* = K (X_t - X_t^*) \quad (9)$$

where * denotes expected values. Solving equations 8 and 9 simultaneously also results in a function that is operationally equivalent to equation 5.

Yet a third model, which is equivalent to equation 5, is due to Nerlove (79). Current values of the exogenous variables are assumed to determine the desired values of electricity consumption. However, adjustment of actual consumption to the desired level is not accomplished in a single period (year). Hence, the adjustment is some fraction of the difference between actual and desired consumption. The Nerlove version can be expressed as

$$EC_t^{**} = \alpha X_t + u_t \quad (10)$$

and

$$\Delta EC = EC_t - EC_{t-1} = b(EC_t^{**} - EC_{t-1}) \quad (11)$$

where ** denotes desired values.

Thus the distributed lag formulation might be justified by three different arguments: (1) consumption is determined on the basis of a weighted average

of past prices and income, (2) consumers purchase electricity on the basis of expected prices and income with an adjustment mechanism for expectations, or (3) households purchase electricity on the basis of current prices and income with a particular type of adjustment lag in setting their rate of consumption. Only the latter rationalization of the model has the characteristic that the reduced or operational form of the model does not exhibit serial correlation if there was none to start with. Conversely, if prior residuals should contain serial correlation, the latter model would allow no chance of improving the situation.

Least Squares Estimates

We can carry out the least squares calculations without making assumptions about the underlying situation. However, the method will only have optimal properties under certain assumptions. Let us begin by assuming a linear model such as

$$Y = \alpha + \beta Z + v$$

where $E(v^2) = w^2$

and $E(v_t) = 0$

for all t (residual variance constant over time). To get an unbiased estimate of the variance one should, in general, divide by $T - K$, where K is the number of estimated coefficients. Hence an unbiased estimate of w^2 is given by

$$w^2 = \frac{1}{t-k} \sum v_t^2.$$

The first consideration about the least squares estimates is whether the coefficients b_i are unbiased estimates. Let us consider b_1 in particular and, within the hypothetical framework of repeated sampling, ask "If we fix the values z_1, \dots, z_T , observe the y 's and calculate the coefficient b_1 which results from a given sample of v 's and do this many times for the same Z 's, in the long run is the average value of b_1 equal to β ($E(b) = \beta$)?" It is clear that we do need some assumptions about the error term to answer this question, because the statistical properties of b_i depend on those of V .

It is convenient to work in mean deviation form. By taking the original equation

$$y_t = \alpha + \beta z_t + v_t$$

and summing over T observations and dividing by T , we have

$$\bar{y} = \alpha + \beta \bar{z} + \bar{v}$$

which, by subtracting, yields

$$y_t - \bar{y} = \beta(z_t - \bar{z}) + (v_t - \bar{v})$$

where \bar{v} is the sample mean of the errors and must be distinguished from the theoretical mean $E(v)$.

Now express b_1 in terms of v in order to study its statistical properties by substituting from the previous equation to yield

$$b = \frac{\sum (y_t - \bar{y})(z_t - \bar{z})}{\sum (z_t - \bar{z})^2} = \frac{\sum [\beta(z_t - \bar{z}) + (v_t - \bar{v})](z_t - \bar{z})}{\sum (z_t - \bar{z})^2}.$$

Multiplying out the terms in the square brackets and simplifying yields

$$b = \beta + \frac{\sum (v_t - \bar{v})(z_t - \bar{z})}{\sum (z_t - \bar{z})^2} = \beta + \sum (v_t - \bar{v}) \left[\frac{z_t - \bar{z}}{\sum (z_t - \bar{z})^2} \right].$$

Now we are in a position to see whether $E(b) = \beta$. The expected value of a sum of terms is equal to the sum of the expected values of each term considered independently so

$$E(b) = \beta + \sum E[(v_t - \bar{v}) \left(\frac{z_t - \bar{z}}{\sum (z_t - \bar{z})^2} \right)]$$

Now if z is fixed the expected value of a constant multiplied by a random variable is equal to the constant multiplied by the expected value of the random variable so that

$$E(b) = \beta + \sum \left(\frac{z_t - \bar{z}}{\sum (z_t - \bar{z})^2} \right) E(v_t - \bar{v}).$$

But $E(v_t) = 0$ so $E(\bar{v}) = 0$ hence every element in the summation is zero and $E(b) = \beta$. If the z is a random variable itself but exogenous and therefore independent of v we need one extra step. Independence of two random variables

implies that the expected value of their product is equal to the product of their separate expected values so that

$$E(b) = \beta + \Sigma E(v_t - \bar{v}) E\left(\frac{z_t - \bar{z}}{(\Sigma(z_t - \bar{z})^2)}\right).$$

Again $E(v_t) = E(\bar{v}) = 0$ hence $E(b) = \beta$ and b is an unbiased estimate of β . In any single sample b will not equal β and there will be a sampling error of $b - \beta$ but these will average out to zero in repeated samples.

No assumption has been made about the presence or absence of autocorrelation in the v_t series nor have we used the assumption about the variance of v_t being constant, i.e., b is unbiased either way. Trouble arises, however, when z_t is a lagged endogenous variable since

$$E\left[(v_t - \bar{v}) \left(\frac{z_t - \bar{z}}{\Sigma(z_t - \bar{z})^2}\right)\right]$$

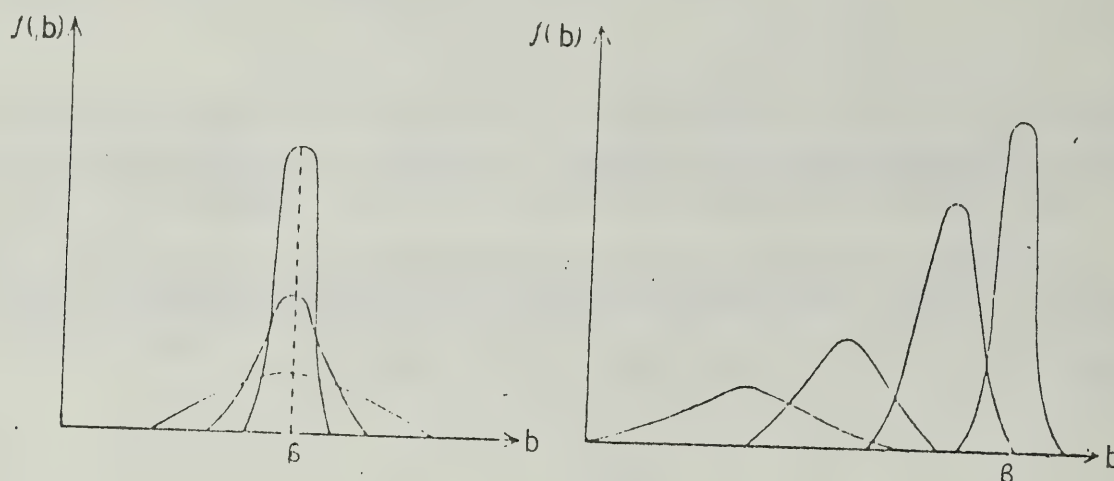
can no longer be divided into a product of two expected values because the two factors inside the square brackets are not independent. For a lagged endogenous variable to be predetermined we require it to be independent of current and future disturbances but we cannot require independence of past errors. (If z_t is the lagged dependent variable $z_t = y_{t-1}$, then z_t depends on v_{t-1}). So v_t in the first factor is related to some z_{t+j} which appears in the denominator of the second factor and independence no longer holds and we cannot prove $E(b) = \beta$. In general, there will be a bias $E(b) - \beta \neq 0$. Therefore, bias is to be expected in the "short cut" distributed lag model.

Asymptotic properties. In a number of situations it is only possible to derive properties of estimators as the sample size T tends to infinity. If no results concerning bias, variance, etc. are obtainable for finite samples then the limiting case is the best we can do. The coefficient b is a consistent estimator of β if the sampling distribution of b approaches a degenerate distribution with all the probability concentrated at β as the sample size T becomes infinite. The probability limit of b is β , i.e.

$$\text{p lim}_{T \rightarrow \infty} b = \beta$$

Consider the possibility of repeating the regression experiment for a given set of z values by drawing a number of samples and calculating b for each sample of y that results. We shall eventually obtain a smooth distribution of b values, the mean and variance of this sampling distribution

have already been found for some cases. Now repeat the process for a new, larger value of T and obtain another distribution of b . Consistency requires that, as we do this for larger and larger sample sizes, the resulting distribution of b collapses to the true value β which we can illustrate as follows.



The second diagram illustrates a situation in which the estimate is biased in small (finite) samples so, for it to be consistent, two things must happen as T increases (1) the distribution must move toward β and (2) become narrower as in the first diagram.

This heuristic discussion rests upon two conditions which are actually sufficient conditions for consistency, asymptotic unbiasedness and a variance tending toward zero i.e., if $\lim_{T \rightarrow \infty} E(b) = \beta$ and $\lim_{T \rightarrow \infty} \text{var}(b) = 0$, then $\text{plim}(b) = \beta$.

In the simplest case of an exogenous z and independent y 's b is a consistent estimate of β for all sample sizes and $\text{var}(b) = w^2/E(z_t - \bar{z})^2 \rightarrow 0$ as $T \rightarrow \infty$.

Plims have a very useful property. The plim of a function of two random variables is equal to the value of the function when the separate plims of the two variables are substituted in, specifically $\text{p} \lim \frac{x_1}{x_2} = \frac{\text{p} \lim (x_1)}{\text{p} \lim (x_2)}$. We also have

$$\text{p} \lim_{T \rightarrow \infty} E \sum v_t \frac{(z_t - \bar{z})}{\sum (z_t - \bar{z})^2} = \frac{\text{p} \lim E \frac{1}{T} \sum v_t (z_t - \bar{z})}{\text{p} \lim E \frac{1}{T} \sum v_t (z_t - \bar{z})^2}$$

enabling us to consider the question of bias in large samples. (We divide the numerator and denominator by T to ensure that the denominator remains finite as $T \rightarrow \infty$ i.e., it is now the variance of z). If z is predetermined (independent of current and future disturbances) we obtain a numerator of zero yielding the result that b is an asymptotically unbiased estimate of β . It is also possible to prove consistency. However, even these techniques do not help if z is lagged endogenous and v is autocorrelated, a likely condition in

most "short cut" distributed lag models. Thus, the "short cut" distributed lag model will yield biased coefficients and it is likely that the bias will not disappear even when the sample size approaches infinity.

Having rejected the time series sample data and the dynamic (as opposed to static) modelling effort implied by time series data, only the pure cross section alternative remains. For the purpose of projecting household electricity consumption in certain specified utility service areas throughout the United States it seemed appropriate to utilize the cities which make up those service areas as sample observations. Thus a cross section regression equation is estimated across selected cities in the United States. The statistical model is consistent with the comparative static framework of analysis whose properties are more completely understood than dynamic economic models.

The economic model incorporates both monetary and physical variables. We stipulate that electricity consumption is affected both by prices of electricity and closely related goods, consumer income, and also by nonmonetary variables such as climate or weather. The neoclassical theory of consumer demand, which is the basis for our model, requires that "rational" consumers base their decisions to allocate their incomes among competing uses on the basis of relative worth to the consumer at the margin and on relative cost. Unless there is reason to suspect that consumers are fooled by inflation of incomes or prices into making irrational decisions, or unless there is reason to think that consumers are acting speculatively (buying to resell at a higher price, for example), it is appropriate to assume that consumers examine the real values and real costs associated with their purchase of electricity. Thus, all prices and income should be expressed in real terms to remove the unwanted variation due to changes in the cost of living (exchange value of money for goods). Deflation of monetary variables has been attempted in some of the previous studies but the accuracy of the deflation is suspect since comparative cost of living indices are only available for cities and most of the pooled cross section and time series models or pure cross section models utilized state rather than city data. Deflation also proved to be a problem for some of the cities in our sample.^{18/} The methods applied to the deflation problem in this study are discussed in Chapter Four.

A final difficulty occurs with regard to the model structure. Conventional theory describes a market in terms of two relationships, the behavior of the consumer or demand and the behavior of the producers and sellers or supply. Some previous studies have included a supply equation in their model of household electricity consumption but with little apparent effect. Nonetheless, correct specification of the structure of a market should include price quantity relationships on the supply as well as the demand side of the market. There is some question as to the meaning of supply in a regulated industry whose price may not always reflect marginal production costs as they would in competitive markets.^{19/} In any event, the result of

^{18/} Nonetheless, experimental regression analysis utilizing non-deflated monetary variables consistently resulted in much less accurate equations. Typically, the coefficient of determination was lowered by 20-30 percent when non-deflated variables were used.

^{19/} Unless utilities are subsidized by general taxes, revenues must cover costs in the long run.

neglecting the supply equation is to estimate a "mongrel" demand equation whose price parameters may be biased through the inclusion of price as a causal variable when it is truly simultaneously determined along with quantity demanded.^{20/} Bias in the estimated price coefficients is due to correlation between the price variable and the error term in the regression equation. The least squares regression technique assumes that no correlation exists and thus calculates a biased price coefficient. The bias is minimized, however, if the error term in the regression is small. That is, if the regression fit (R^2) is very high, then the residual variance is small and the extent of the correlation of the price variable and error term is reduced. Bias should be minimized if the fit of the regression equation to the sample data is very good. This factor may partly explain the lack of large differences among studies which incorporated two equations as opposed to studies which only estimated a demand relationship. Every effort has been expended here to optimize the fit of the estimated demand equation. Efforts toward this goal seem to bring more immediate reward than do the efforts toward estimation of a simultaneous model. The latter is most important, however, if a better understanding of the market is the primary goal (as opposed to developing a forecast).

Specification Error

Once the correct specification of the model is assumed, model estimation and model testing become relatively straightforward. In reality, however, one can never be sure that a given model is correctly specified. In fact, applied researchers usually examine more than one possible model specification, attempting to find the specification which best describes the physical process under study.

Underspecification

Consider first the case in which a variable is omitted from a "true" or correct model specification. Assume that the true model is given by

$$Y_i = \beta_2 x_{2i} + \beta_3 x_{3i} + U_i$$

while the regression model is given by

$$Y_i = \beta_2^* x_{2i} + U_i^* .$$

If all the assumptions of the classical linear model hold, the estimated slope parameter is

$$\hat{\beta}_2^* = \frac{\sum x_{2i} Y_i}{\sum x_{2i}^2} .$$

^{20/} Note the graph shown in Figure 2.

Substituting y_i , as defined in the true model, into the estimator equation for β_2 yields

$$\begin{aligned}
 \hat{\beta}_2 &= \frac{\sum x_{2i} \beta_2 x_{2i} + \sum x_{2i} \beta_3 x_{3i} + \sum x_{2i} U_i}{\sum x_{2i}^2} \\
 &= \frac{\beta_2 \sum x_{2i}^2 + \beta_3 \sum x_{2i} x_{3i} + \sum x_{2i} U_i}{\sum x_{2i}^2} \\
 &= \beta_2 + \beta_3 \frac{\sum x_{2i} x_{3i}}{\sum x_{2i}^2} + \frac{\sum x_{2i} U_i}{\sum x_{2i}^2} \\
 &= \beta_2 + \beta_3 \frac{\sum x_{2i} x_{3i}}{\sum x_{2i}^2} \\
 &= \beta_2 + \beta_3 \frac{Cor(x_2, x_3)}{Var(x_2)}
 \end{aligned}$$

Since there is no guarantee that the second term will be 0, the least-squares slope estimate yields a biased estimate of the true slope parameter β_2 . This bias will not disappear as the sample size grows large so that the omission of a variable from the true model yields inconsistent parameter estimates as well. The only case in which the bias (and inconsistency) will completely disappear occurs when $COV(x_2, x_3) = 0$, that is, when x_2 and x_3 are uncorrelated in the sample. This result generalizes if there are numerous independent variables. Only when the omitted variable is uncorrelated with all the included independent variables does the bias disappear, which is extremely unlikely with data on the demand for electricity.

The formula above is useful because it tells that the direction of any bias which might occur depends upon the correlation between the omitted variable and all included variables as well as on the sign of the true slope coefficient β_3 . To the extent that x_2 and x_3 are highly correlated the coefficient of x_2 will include the effect of the x_3 variable and will be biased. When x_2 and x_3 are uncorrelated x_2 picks up none of the effect of x_3 and no bias occurs. As a practical matter it is the extent of the specification bias which is important. This suggests that a careful researcher will consider not only the question of missing variables but their possible correlation with included model variables as well.

To be complete, we should pause to consider the effect of variable omission on the error variance and its estimate. First consider the case in which x_2 and x_3 are uncorrelated. Then $\hat{\beta}_2$ will be an unbiased estimator of β_2 and will have an identical variance with β_2 . The only difficulty with model misspecification arises because the usual *estimate* of the variance

of β_2 will be biased. However, in the more general case when x_2 and x_3 are correlated the two estimators will not have identical variances. In the two variable model, the actual variance of β_2 will be less than the actual variance of β_2 , even though the model is misspecified. If one is willing to give up lack of bias as an important objective then the omitted variable specification has some merit. In certain cases, specification bias can prove useful as a tool of analysis.

The theory of specification error is germane to our study because variables which measure electric appliance stocks have been intentionally excluded from our model. It is reasonable to hypothesize that households with larger numbers of electric appliances will tend to purchase more electricity than would households with fewer appliances and/or with nonelectric appliances. The results of previous studies, and our own experiments (reported in a later chapter) verify this conjecture. Discussion in Chapter VI argues for the need to perform added research making use of recently acquired data on alternative fuel prices by city and the further development of some rather complex econometric models of the household electricity market in conjunction with appliance stocks. For the purposes of this part of the research, data with which to project appliance stocks into the future were sketchy and the models which were built and tested using the available data did not fit more accurately than the less complicated model presented here. Since the use of econometric models for making forecasts requires projecting future values of the causal variables it is preferable to select the model which requires the fewest independent variables, all other things equal. (It is our belief, however, that continued development of the more realistic models of the household electricity market will be worthwhile in the light of the recently acquired fuel price data.)

The exclusion of electric appliance stocks from the electricity demand equation has the effect of biasing the coefficients of other variables included in the estimated equation if they are correlated with the excluded appliance stocks variables. The following examples will demonstrate the nature of the bias. It is shown that the exclusion of electric appliance stocks from the model tends to increase the direct price effects estimated in the model. It is argued that this is useful since electricity price would have influenced appliance stocks which then would have affected electricity sales. The exclusion of appliance stocks simply short cuts the process and attributes changes in electricity consumption directly to its price rather than distributing the effect of price changes between the change in the utilization rate of electric appliances and the changes in electric appliance stocks.^{21/}

For example consider a true demand model given by

$$Q_i = b_2 P_i + b_3 AC_i + b_4 SH_i + U_i$$

where Q is kWh per customer per year, P is electricity price, AC is the percent of households which have electric air conditioning and SH is the

^{21/} We believe that rising electricity prices would cause reductions in the rate of utilization of electric appliances and encourage the substitution of nonelectric appliances.

percent of households with electric space heating. A regression is estimated in which AC and SH are intentionally excluded, i.e.,

$$Q_i = b_2 P_i + e_i$$

so that $e_i = b_3 AC_i + b_4 SH_i + u_i$

It is easily shown from the previous discussion that the expected value of the price coefficient in the underspecified regression equation will be

$$E(b_2) = b_2 + b_3 C_{AC} + b_4 C_{SH}$$

where $C_{AC} = \frac{\sum AC_i P_i}{\sum P_i^2}$ as in the regression

$$AC_i = C_{AC} P_i + v_i$$

and $C_{SH} = \frac{\sum SH_i P_i}{\sum P_i^2}$

as in the regression

$$SH_i = C_{SH} P_i + \epsilon_i.$$

If the signs of the C_{AC} and C_{SH} terms are known then the direction of the bias may be deduced. C_{AC} and C_{SH} measure the effects of electricity price on the ownership of electric cooling and heating appliances. *A priori* reasoning and previous research have both shown that $C_{AC} < 0$ and $C_{SH} < 0$. It has previously been shown that $b_3 > 0$ and $b_4 > 0$ since households with a larger share of electric appliances tend to purchase more electricity. Thus the net effect of the bias in b_2 , introduced by exclusion of AC and SH from the demand model, is negative, i.e., $b_3 C_{AC} + b_4 C_{SH} < 0$.

Since the effect of electricity price on electricity consumption is also negative ($b_2 < 0$) the bias tends to increase the absolute value of the price coefficients. Price is attributed more direct influence over consumption than truly exists. The bias is innocuous, however, because the biased price coefficient combines both the direct effect of price on appliance utilization rates and the indirect effect of price on electric appliance stocks.

Measurement of both phenomenon is thus incorporated in the forecasting equation.

The Log-Linear Functional Form

Any equation form selected to represent a demand function must be considered an approximation because of limitations imposed by the regression technique. The basic premise, supplied by neoclassical economic theory, is that a negative or inverse price-quantity relationship holds. In addition to the criteria of the best statistical fit to the data, a particular functional form may be selected for ease of use and other attributes. The log-linear functional form is extremely popular in demand studies. In this section, we point out a particular advantage of this equation form which allows the use of easily obtained average price data (which some would argue is also the most appropriate) to estimate a model which is also consistent with marginal price data (the "correct" price measure according to economic theory). The second topic of this section points out an often ignored statistical problem associated with the use of log-transformations applied to variables used in regression analysis.

Use in Avoiding the Average-Marginal Price Controversy

A marginal-average price discrepancy exists because electricity is not sold at a flat rate. The average price a consumer pays depends on the amount of energy purchased. Additional, or "marginal," units of the product become less expensive, usually at set intervals of "blocks" purchased per month. Consumers choose the amount to be consumed on the basis of an entire rate schedule of prices. This creates a kinked budget constraint or total cost curve for the consumer (Figure 3). It appears impossible to define a traditional demand schedule for an individual because there are as many prices as there are rates in the declining block rate structure. If one constructs a demand schedule for each of these rates, assuming that the others are held constant, the kinked budget constraint results in a discontinuous "marginal price" demand schedule (Figure 4). The discontinuity occurs when the consumer moves from one rate to the next. This problem is resolved when data are aggregated over many individual demand schedules. Blattenberger (13) is able to show that a discontinuity does not appear in the aggregated demand function if the individuals' utility functions are randomly distributed and if the population is large. The discontinuities that appear in the aggregation process become so small relative to the total aggregate purchase that they can be ignored.

A second problem remains, however, with the use of average price in the elasticity demand model. Traditional economic theory assumes that consumers react to changes in the marginal rates, not the average price of fuel. It is argued that elasticities which are calculated using average price data may yield a distorted view of reality. It is unclear whether many consumers know what the marginal price is for the rate block of their consumption level. While average price is a result of previous consumption, as well as current consumption, consumers may be better able to predict average price than marginal price.

The controversy is moot if one adopts the log-linear functional form. The log-linear form has the property that the price elasticities (and other

Figure 3--Budget constraint kinked by a three-rate schedule

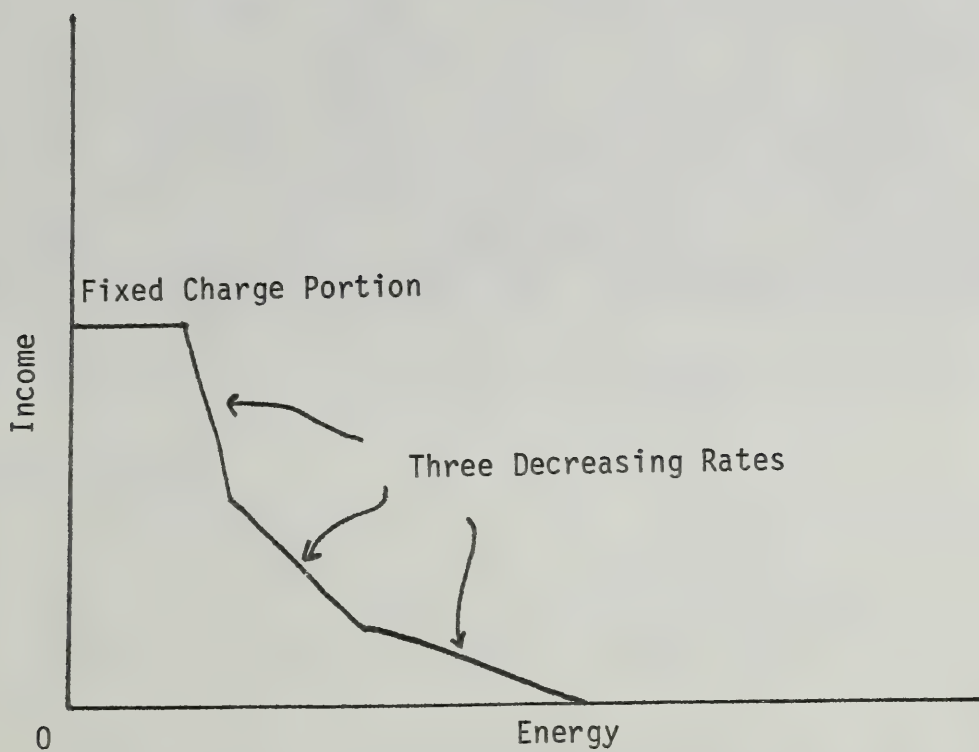
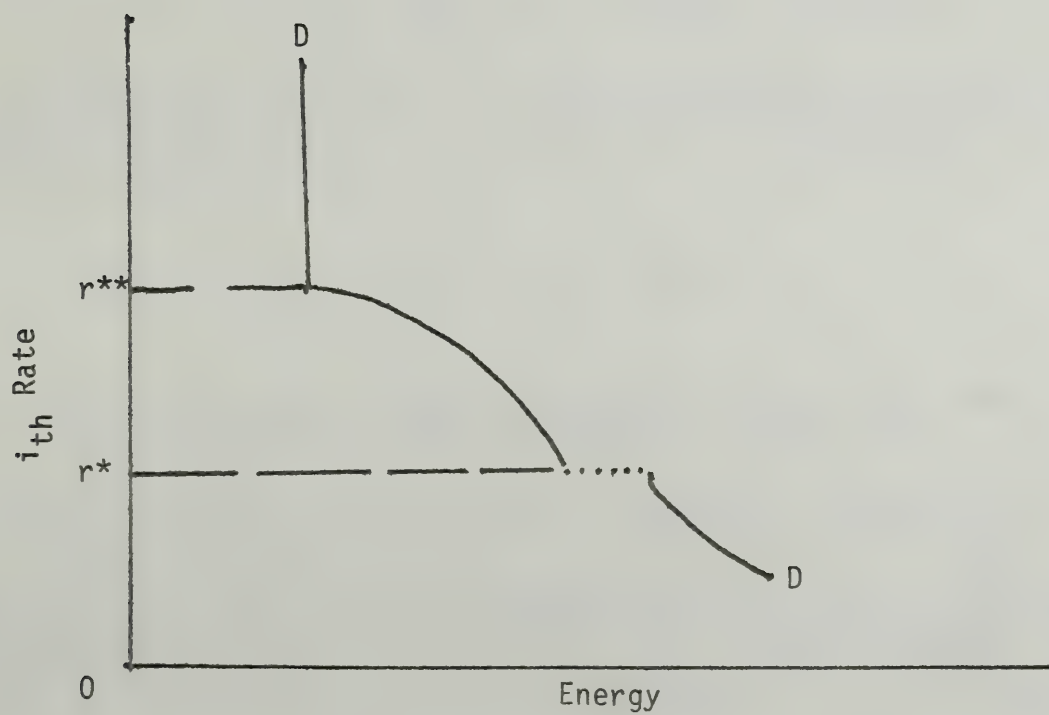


Figure 4--Individual consumer's demand schedule for one rate with all other rates, prices and income constant



elasticities) are shown directly by the estimated regression slope coefficients. Since these coefficients are constants, it follows that the log-linear model assumes constant elasticities. Halvorsen (51) first showed that if one approximated the actual rate schedule with a smooth function, and if the elasticity of that function were constant, then the marginal price of energy would be the average price times a scalar. Halvorsen is then able to show that the marginal price elasticity of demand will equal the price elasticities calculated from average price data. The proof follows.

Let P_a stand for the average price of electricity, P_m for the marginal price, Q for the kWh per customer per year and Z_i for the other causal variables in the demand function. The log-linear demand model could be stated as

$$P_a = c Q^b \Pi_i Z_i^d$$

Total revenue is defined as

$$P_a Q = \int_0^Q P_m dQ$$

where $P_m = f(Q)$ is the rate schedule or

$$(c Q^b \Pi_i Z_i^d) (Q) = \int_0^Q P_m dQ.$$

Taking the derivative with respect to Q we have

$$(1+b) (c) (Q^b \Pi_i Z_i^d) = P_m$$

or

$$(1 + b) P_a = P_m.$$

If the log-linear model is estimated using average prices, i.e.,

$$Q_i = \alpha P_{a_i}^\beta \Pi_j Z_{ji}^\gamma + e_i$$

the average price elasticity will be shown by $\hat{\beta}$ and since $P_a \equiv \frac{P_m}{1+b}$ the regression equation will be

$$\ln Q = \text{antilog } \hat{\alpha} + \hat{\beta} \ln P_a + \sum_i \hat{\gamma}_i Z_i$$

which can be written as

$$\ln Q = \text{antilog } \hat{\alpha} + \hat{\beta} (\ln P_m - \ln(1+b)) + \sum_i \hat{\gamma}_i Z_i$$

where $\ln(1+b)$ is a constant.

As is well known, the addition of a constant to a variable has no effect on the estimation of the partial regression coefficient. Therefore, estimated on $[\ln P - \ln(1+b)]$ is identical to on . Use of the average price does not affect the estimation of although the constant term in the demand function will be biased. In this manner the use of the log-linear functional form sidesteps the marginal-average price controversy. The elasticity estimates apply either to average or marginal prices.

An Unresolved Problem

The doublelog function form

$$\ln Q = \ln A + \sum_{i=1}^n \beta_i \ln x_i \quad (12)$$

is obtained by taking the logarithms of a multiplicative, or "Cobb-Douglas" type model, such as

$$Q = A \prod_{i=1}^n x_i^{\beta_i}.$$

It is the multiplicative model (13) which holds theoretical significance but, since it is nonlinear, its estimation cannot be obtained by the standard techniques for linear models. Thus, model (13) is transformed into

$$\ln Q = \ln A + \sum_{i=1}^n \beta_i \ln x_i$$

for the specific purpose of easier estimation (Johnston (64)).

Since an exact one-to-one transformation exists between these two forms, it may appear that the properties of the estimated coefficients in the logarithmically transformed model (12) will remain the same when they are converted back to the theoretical model (13), which specifies the relationships between the variables which are actually observed. It must, however, be pointed out that the mathematical models given above, and the statistical model used for estimation, are distinct. When statistical models

are transformed by nonlinear operations the distribution of the random variables involved must also be transformed. Statistical properties which hold in one distribution need not hold in a different distribution.

The statistical form of the logarithmically transformed model (12) is generally written as

$$\ln Q_j = \ln A + \sum_{i=1}^n \beta_i \ln x_{ij} + \varepsilon_j \quad (j=1, \dots, m). \quad (14)$$

This statistical specification of model (14) automatically requires that the original multiplicative model (13) be statistically specified as

$$Q_j = A \prod_{i=1}^n x_{ij}^{\beta_i} e^{\varepsilon_j} \quad \text{or} \quad Q_j = A \prod_{i=1}^n x_{ij}^{\beta_i} \varepsilon_j^*$$

where $\varepsilon_j^* = e^{\varepsilon_j}$.

Thus, the additive error term in model (14) becomes multiplicative in model (15). The appropriateness of a multiplicative error must be decided on an individual case basis (Sprent (89) since the variance of Q_j increases as the values of the explanatory variables increase.

It is also well known that any desirable properties (such as unbiasedness) which may hold for the estimates of the parameters in the logarithmically transformed model (14) need not hold for the corresponding parameters in the model (15) of theoretic interest (Goldberger (41)).

In order to obtain desirable properties (such as unbiasedness) in the transformed model (14) the expected or mean value of the error term ε_j must be zero. It is also desirable that the expected or mean value of the stochastic theoretic model (15) equal the function of the explanatory variables specified in the original multiplicative model (13), i.e., that $E\varepsilon_j = 0$. By utilizing the Jensen Inequality it is easily shown that these two conditions cannot be simultaneously met in any practical problem (see Appendix I). If the expected value of ε_j in model (14) is zero, so that the standard estimation techniques can be utilized, the average value of Q in model (15) will be greater than

$$A \prod_{i=1}^n x_i^{\beta_i}$$

since it will also be a function of the variance of ε_j in model (14).

This functional form also has the inherent requirement that each of the explanatory variables used in the model has constant elasticity (56). If this functional form is used to estimate a relationship where the explanatory variables do not have constant elasticities, the estimates of these elasticities will be biased and the variation of the dependent variable will not be adequately explained because the model does not adequately reflect reality. Therefore, even if all the relevant explanatory variables were contained in the model, the estimates of their elasticities could be severely biased due to the constraint of constant elasticity. Functional forms which require constant elasticity (such as double-log) should therefore be avoided whenever the elasticities of the explanatory variables are known to vary considerably as quantity levels change.

Since every functional form always possesses certain advantages and disadvantages, it is highly advisable that a group of functional forms, each of which is consistent with the theory involved, be investigated. Other functional forms which are consistent with demand theory and widely used are the loghyperbola, semilog, linear, and hyperbola (83).

In order to use standard estimation techniques on model (14), $E(\epsilon)$ must be zero. By the Jensen Inequality^{22/}, $E(e^\epsilon)$ in model (15) must be greater than or equal to $e^{E(\epsilon)}$ with the equality holding only in the trivial case where $\text{var}(\epsilon) = 0$. Therefore,

$$E(Q | X_i) = E\left(A \prod_{i=1}^n X_i^{\beta_i} e^\epsilon\right) = A \prod_{i=1}^n X_i^{\beta_i} E(e^\epsilon)$$

since

$$E(e^\epsilon) \geq e^{E(\epsilon)} \quad \text{if } E(\epsilon) = 0 \text{ and } E(Q | X_i) \geq A \prod_{i=1}^n X_i^{\beta_i} e^{E(\epsilon)} = A \prod_{i=1}^n X_i^{\beta_i}$$

where $e^0 = 1$.^{23/}

Selecting the "Best" Regression Equation

Suppose we wish to establish a linear regression equation to project electricity consumption in terms of "independent" or predictor variables X_1 ,

^{22/} Jensen Inequality: Let x be a random variable with mean $E(x)$ and let $g(\cdot)$ be a convex function. Then $E[g(x)] \geq g[E(x)]$.

^{23/} Example: Let x be a uniformly distributed discrete random variable which can have values of -1, 0, or 1, each with a probability of

$$E[e^x] = 1/3 e^{-1} + 1/3 e^0 + 1/3 e^1 \approx 1.362053 \text{ and } E(x) = 1/3(-1) + 1/3(0) + 1/3(1) = 0.$$

Therefore

$$E[e^x] > e^{E(x)}.$$

X_2, \dots, X_k . We assume this is the complete set of variables from which the equation is to be chosen and includes any transformation, such as logarithms, squares and cross products, thought to be desirable and necessary. Two opposing criteria for selecting an equation are usually involved. They are

1. to make the equation useful for predictive purposes, we should want our model to include as many X's as possible so that reliable fitted values can be determined and
2. because of the costs and possible errors involved in obtaining accurate projections on a large number of X's we should like the equation to include as few X's as possible.

The compromise between these extremes is what is usually called selecting the best regression equation. There is no unique statistical procedure for doing this and personal judgment is a necessary part of any of the statistical methods discussed. In this section we describe several procedures which appear to be in current use. To add to the confusion, they may not all necessarily lead to the same solution when applied to the same problem.^{24/} The procedures are discussed (1) all possible regressions, (2) backward elimination, (3) forward selection, and (4) stepwise regression.^{25/}

All Possible Regressions

This procedure is extremely cumbersome and is very expensive, even with access to a high speed computer. The procedure first requires the fitting of every possible regression equation which involves a constant X_0 plus any number of the variables X_1, \dots, X_k . Since each X_i can either be, or not be, in the equation (two possibilities) and this is true for every $X_i, i = 1, 2, \dots, k$ (k X's), there are 2^k equations. (The X_0 term is always in the equation.) If $k = 10$ (a not unusually excessive number) $2^k = 1024$ equations must be examined for the second step in the procedure! Here the regressions are divided into sets of runs which involve p variables, $p = 1, 2, \dots, k$ and each set is ordered according to some criterion. Usually the criterion is the value of R^2 achieved by the least squares fit. The leaders in this ordering within each set are then selected for further examination and a decision is made, after viewing the R^2 values, on which equation is best to use. As an example, consider a model with a possibility of as many as four independent variables. The procedure is

1. Divide the runs into five sets
 - Set A consists of the run with only the mean value
 - Set B consists of the four 1-variable runs
 - Set C consists of all the 2-variable runs
 - Set D consists of all the 3-variable runs.
 - Set E consists of the run with 4 variables.

^{24/} Indeed, such is the case in some of the experimental models tested in this study.

^{25/} Future analysis of our cross city data should include the application of flexible functional forms (Box-Cox curves). A recent application is shown in "Analysis of Flexible Engel Functions" by Blaylock and Green (14).

2. Order the runs within each set by the value of the square of the multiple correlation coefficient R^2 .
3. Examine the leaders and see if there is any consistent pattern of variables in the leading equations in each set. For example, suppose

Set	Variables in equation	R^2
Set B	$Y = f(X_4)$	67.5%
Set C	$Y = f(X_1, X_2)$	97.9%
	$Y = f(X_1, X_4)$	97.2%
Set D	$Y = f(X_1, X_2, X_4)$	98.234%
Set E	$Y = f(X_1, X_2, X_3, X_4)$	98.237%

(Notice that in set C there are two leaders with practically the same R^2). If we view these results, we see that after two variables have been introduced further gain in R^2 is minor. Examination of the correlation matrix for the data reveals that $(X_1 \text{ and } X_3)$ and $(X_2 \text{ and } X_4)$ are highly correlated. Thus, the addition of further variables, when X_1 and X_2 or X_1 and X_4 are already in the regression equation, will remove very little of the unexplained variation in the response. This is clearly shown by the slight increase in R^2 from set C to set D. The gain in R^2 from set D to set E is extremely small.

What equation should be selected for further attention? One of the equations in set C is clearly indicated but which one? If $f(X_1, X_2)$ is chosen there is some inconsistency because the best single variable equation involves X_4 . For this reason, many researchers would prefer to use $f(X_1, X_4)$. The examination of all possible regressions does not provide a clear-cut answer to the problem. Other information, such as knowledge of the characteristics of the process studied and the physical role of the X-variables must as always be added to enable a decision to be made.

In general, the analysis of all regressions is quite unwarranted. While it means that the statistician has "looked at all possibilities" it also means he has examined a number of regression equations that intelligent thought would reject. The amount of computer time used is wasteful and the sheer physical effort of examining all the computer printouts is enormous when more than a few variables are being examined. A selection procedure which shortens this task is preferable.

The Backward Elimination Procedure

The backward elimination method is an improvement on the "all regressions" method in that it attempts to permit the examination, not of all regressions but of only the "best" regression containing a certain number of variables. The basic steps in the procedure are

1. A regression equation containing all variables is computed.
2. The partial F-test value is calculated for every variable treated as though *it were the last variable to enter the regression equation.*
3. The lowest partial F-test value, F_L , is compared with a preselected significance level F_0 .
 - (a) If $F_L < F_0$, remove the variable X_i which gave rise to F_L from consideration and recompute the regression equation in the remaining variables. Then repeat stage 2.
 - (b) If $F_L > F_0$, adopt the regression equation as calculated.

First perform the regression on all independent variables. In the previous example find the least squares equation $Y = f(X_1, X_2, X_3, X_4)$. In order to eliminate variables one must determine the contribution of each of the variables X_1, X_2, X_3 , and X_4 to the regression sum of squares as if each were in the last position. The partial F-values provide measures of these contributions. Using the partial F-test, choose the smallest value and compare it to some critical value of F based on a predetermined risk. If the F value for X_3 for example, is smaller than the critical value, X_3 is removed from the equation. Next, find the least squares equation $Y = f(X_1, X_2, X_4)$. Examining this equation one sees that X_4 should be removed. The procedure for this elimination is similar to the preceding elimination.

We now find the least squares equation $Y = f(X_1, X_2)$. Both variables X_1 and X_2 are significant, regardless of position, as indicated by the significant partial F's. Thus, the backward elimination selection procedure is terminated and yields

$$Y = b_0 + b_1X_1 + b_2X_2.$$

This is, in general, a satisfactory procedure, especially for statisticians who like to see all the variables in the equation so as "not to miss anything." It is much more economical of computer time and manpower than the "all regressions" method. However, if the total input data set yields an $X'X$ matrix which is ill-conditioned, i.e. singular, then this procedure may yield nonsense because of rounding errors. With more refined computer programs, this is not usually a serious problem.

The Forward Selection Procedure.

The backward elimination method begins with the largest regression using all variables and subsequently reduces the number of variables until a decision is reached on the equation to use. The forward selection procedure is an attempt to achieve a similar conclusion working in the other direction, i.e., to insert variables until the regression equation is satisfactory. The order of insertion is determined by using the partial correlation coefficient as a measure of the importance of variables not yet in the equation. The basic procedure is to first select the X most correlated with Y (suppose it is

X_1) and find the first-order, linear regression equation $Y = f(X_1)$. Next find the partial F values for each of the remaining variables to enter the equations. As each variable is entered into the regression the following values are examined.

1. R^2 , the multiple correlation coefficient.
2. The partial F-test^{26/} value for the variable most recently entered which shows whether the variable has taken up a significant amount of variation over that removed by variables previously in the regression.

As soon as the partial F value related to the most recently entered variable becomes nonsignificant the process is terminated.

The forward selection procedure is more economical of computer facilities than the methods previously discussed and it avoids working with more X's than are necessary while improving the equation at every stage. One of its disadvantages is that it makes no effort to explore the effect that the introduction of a new variable may have on the role played by a variable which entered at an earlier stage. This deficiency is overcome by the stepwise procedure.

The Stepwise Regression Procedure.

In spite of its entirely different name, this procedure is an improved version of the forward selection procedure discussed in the previous section. The improvements involve the reexamination, at every stage, of the regression of the variables incorporated into the model in previous stages. A variable which may have been the best single variable to enter at an early stage may, at a later stage, be superfluous because of the relationships between it and other variables in the regression. To check on this the partial F criterion for each variable in the regression at any stage of calculation is evaluated and compared with a preselected percentage point of the appropriate F distribution. This provides an estimate of the contribution made by each variable irrespective of its actual point of entry into the model. Any variable which provides a nonsignificant contribution is removed. This process is continued until no more variables are admitted or rejected.

We believe this to be the best of the variable selection procedures and recommend its use. However, stepwise regression can easily be abused. As with all the procedures discussed, sensible judgment is still required in the initial selection of variables and in the critical examination of the model via examination of residuals. It is easy to rely too heavily on the automatic selection made by the computer. All variables tested should be consistent with "a priori" constructs. It is methodologically improper to use the iterative regression techniques to sort variables selected at random and then to claim that a hypothesis test has been performed.

In a theoretical sense, the "all regressions" procedure is best because it enables one to "look at everything." Much would depend on the rejection levels for the F-tests, however, and also on the statisticians' feelings about

^{26/} The t test is equivalent in this instance.

the increase desired in R^2 when all regressions are viewed. Inconsistent choices might lead to entirely different equations being reached.

Our own preference, for a practical regression method, is the stepwise procedure. Our second choice is the backward elimination. In cases of doubt, all regressions could be viewed if the effort is reasonable. The other methods given are, in our opinion, of lesser value but each has its use in special cases.

Conditional Forecasting

Our previous discussion has implicitly assumed that the explanatory variables are known without error. This can be an unrealistic assumption since some explanatory variables may have to be predicted before the single equation regression model can be used. One may intuitively expect that the stochastic nature of the predicted value of the X's will lead to forecasts of Y which are less reliable. We shall show that the 95 percent confidence intervals for the error of forecast are indeed increased in size when the X's themselves must be predicted. However, it is quite difficult to derive analytic results for the error of forecast in a general setting. We deal, therefore, with a special case which, though somewhat restrictive, should be instructive.

Consider the following model

$$Y_t = \alpha + \beta X_t + e \quad t=1, 2, \dots, T$$

where

$$e_t \sim N(0, \sigma^2), U_t \sim N(0, \sigma_u^2), e_t \text{ and } U_t \text{ are uncorrelated,}$$

$$E[(\hat{X}_{t+1} - X_{t+1})(\hat{\beta} - \beta)] = E[(\hat{X}_{t+1})(\hat{\alpha} - \alpha)] = 0, \text{ and}$$

$$\hat{\alpha} \text{ and } \hat{\beta} \text{ are the OLS estimates of } \alpha \text{ and } \beta.$$

The model presumes that X_{T+1} is projected in such a way that its error of forecast has 0 mean and constant variance. In addition, the error process associated with the forecast of X_{T+1} is assumed to be independent of the error process associated with each of the Y's in the model. Even though they are stochastic in nature, the X's are still presumed to be exogenous in the sense that they are uncorrelated with the equation error term. The restrictiveness of this model becomes clear when we consider the means by which forecasted values of X_{T+1} might be obtained. One frequently used procedure is to extrapolate from the sample values of X. While numerous extrapolation routines are available, the likelihood that the X variable is autocorrelated in a time-series model suggests that the error of forecast associated with the extrapolation procedure is itself likely to be serially correlated.

The forecasted value of Y in the time period $T + 1$ is defined by

$$\hat{Y}_{T+1} = \hat{\alpha} + \hat{\beta} \hat{X}_{T+1}.$$

The error of forecast is then

$$\Delta_{T+1} = \hat{Y}_{T+1} - Y_{T+1} = (\hat{\alpha} - \alpha) + (\hat{\beta}\hat{X}_{T+1} - \beta X_{T+1}) - e_{T+1} \quad (16)$$

It is easy to see that this error has 0 mean by computing

$$\begin{aligned} E(\Delta_{T+1}) &= E(\hat{\alpha} - \alpha) + E(\hat{\beta}\hat{X}_{T+1} - \beta X_{T+1}) - E(e_{T+1}) \\ &= E[\hat{\beta}(X_{T+1} + u_{T+1})] - \beta X_{T+1} = \beta X_{T+1} - \beta X_{T+1} = 0 \quad (17) \end{aligned}$$

since $\hat{\beta}$ and u_{T+1} are uncorrelated.

The variance of the error of forecast is

$$\begin{aligned} \sigma_f^2 &= E[(\Delta_{T+1})^2] = E[(\hat{\alpha} - \alpha)^2] + E[(\hat{\beta}\hat{X}_{T+1} - \beta X_{T+1})^2] \\ &\quad + E[(e_{T+1})^2] + 2E[(\hat{\alpha} - \alpha)(\hat{\beta}\hat{X}_{T+1} - \beta X_{T+1})]. \quad (18) \end{aligned}$$

But since

$$\hat{\beta}\hat{X}_{T+1} - \beta X_{T+1} = \hat{\beta}(\hat{X}_{T+1} - X_{T+1}) + X_{T+1}(\hat{\beta} - \beta) \quad (19)$$

then,

$$\begin{aligned} E[(\hat{\beta}\hat{X}_{T+1} - \beta X_{T+1})^2] &= E[\hat{\beta}(\hat{X}_{T+1} - X_{T+1}) + X_{T+1}(\hat{\beta} - \beta)]^2 \\ &= E[\hat{\beta}^2(\hat{X}_{T+1} - X_{T+1})^2] + X_{T+1}^2 E[(\hat{\beta} - \beta)^2] \\ &= [\beta^2 + \text{Var}(\hat{\beta})\sigma_u^2 + X_{T+1}^2 \text{Var}(\hat{\beta})] \quad (20) \end{aligned}$$

In arriving at Equation (20), we took advantage of the fact that $u_{T+1} = \hat{X}_{T+1} - X_{T+1}$ that u_{T+1} and $\hat{\beta}$ are uncorrelated, and, finally, that $\hat{\beta}^2 = \beta^2 + \text{Var}(\hat{\beta})$.

Next, we can use Equation (19) to simplify the last term in Equation (18), i.e.,

$$\begin{aligned} E[(\hat{\alpha} - \alpha)(\hat{\beta}X_{T+1} - \beta X_{T+1})] &= E[(\hat{\alpha} - \alpha) \hat{\beta}(\hat{X}_{T+1} - X_{T+1})] \\ &\quad + X_{T+1} E[(\hat{\alpha} - \alpha)(\hat{\beta} - \beta)] \\ &= X_{T+1} \text{Cov}(\hat{\alpha}, \hat{\beta}). \end{aligned}$$

Now, by combining terms, we find that

$$\begin{aligned} \sigma_f^2 &= \text{Var}(\hat{\alpha}) + [\beta^2 + \text{Var}(\hat{\beta})] \sigma_u^2 + X_{T+1}^2 \text{Var}(\hat{\beta}) + 2X_{T+1} \text{Cov}(\hat{\alpha}, \hat{\beta}) + \sigma^2 \\ &= \text{Var}(\hat{\alpha}) + \text{Var}(\hat{\beta})[X_{T+1}^2 + \sigma_u^2] + 2X_{T+1} \text{Cov}(\hat{\alpha}, \hat{\beta}) + \sigma^2 + \beta^2 \sigma_u^2. \end{aligned} \quad (22)$$

Putting this in terms of the least-squares estimators the formula for the variance of the error of forecast becomes

$$\sigma_f^2 = \sigma^2 \left[1 + \frac{1}{T} + \frac{(X_{T+1} - \bar{X}) + X_{T+1} \sigma_u^2}{\sum (X_t - \bar{X})^2} \right] + \beta^2 \sigma_u^2 \quad (23)$$

$$\sigma_f^2 (X \text{ known}) = \sigma^2 \left[1 + \frac{1}{T} + \frac{(X_{T+1} - \bar{X})^2}{\sum (X_t - \bar{X})^2} \right]. \quad (24)$$

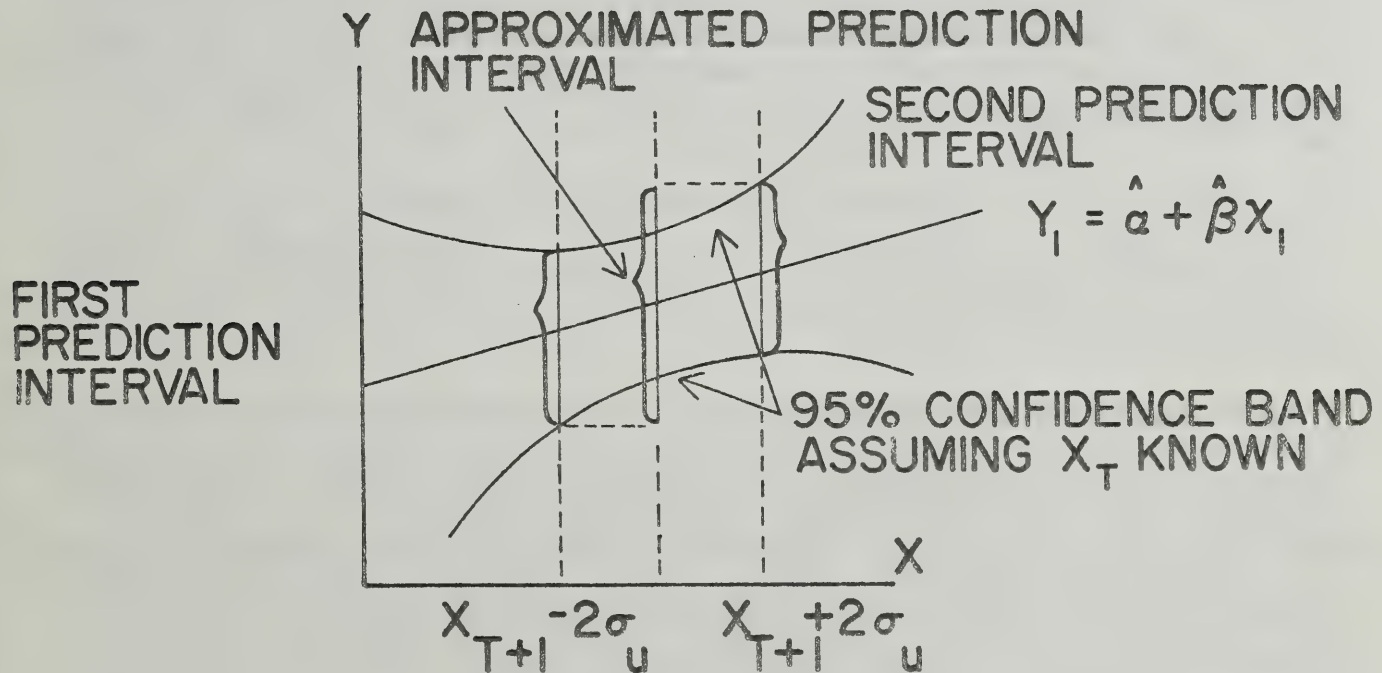
A comparison of Equation (23) with Equation (24) makes it clear that the stochastic nature of the forecasted value of X increases the error of forecast. There are two additional nonnegative terms involved, both of which are minimized only when the forecast of X_{T+1} is made with 0 error variance. This result makes it quite clear that the 95 percent confidence intervals associated with the forecasted value of Y_{T+1} will be larger than the intervals described in the unconditional forecasting derivation. Unfortunately, it is quite difficult to describe the confidence intervals for the conditional error of forecast. The difficulty arises because the forecast variable Y_{T+1} is not normally distributed since it involves the sum of *products* of normally distributed variables. While confidence intervals cannot be derived analytically they can be approximated using computer simulation techniques. A rather crude estimate of the confidence interval might be obtained as follows:

1. Calculate the 95 percent confidence intervals associated with the forecast that would be obtained were we to select X_{T+1} to be two

standard deviations higher or lower, i.e., the confidence intervals associated with

$$Y_{T+1}^* = \hat{\alpha} + \hat{\beta}(\hat{X}_{T+1} + 2\sigma_u) \quad \text{and} \quad Y_{T+1}^{**} = \hat{\alpha} + \hat{\beta}(\hat{X}_{T+1} - 2\sigma_u).$$

2. The final interval prediction is taken to be the union of the two confidence intervals, i.e., it contains all the values of Y_{T+1} common to both confidence intervals. This process is depicted by



The Prediction Interval for a Conditional Forecast

The results of this discussion help to accentuate some of the difficulties involved in the forecasting process. Even if the regression model has a good fit with statistically significant parameters, unconditional forecasts may not be very accurate. In addition, the process of forecasting or extrapolating the explanatory variables into the prediction period introduces additional forecast error which diminishes the reliability of the regression model. In forecasting, the problem is made even more difficult because an accurate initial conditional forecast may lead to a shift in policy and thus to an inaccurate forecast!

Summary of Methodology

A cross section data set across cities was selected because (1) demand predictions were required by utility service area and city data more closely approximated service areas than did state data, (2) deflators for cost-of-living are only available for cities and might be quite inaccurate if applied

to state data, (3) although time series data were collected the statistical difficulties inherent in time series analysis and the lack of consistency among previous time series studies justified an initial cross section analysis, (4) a large degree of variability in price and household consumption exists in the cross section data which allows forecasts without extrapolating outside the range of the data, and (5) cross section analysis incorporates the long run effects of price differences on both the rate of utilization of appliance stocks and the effects on the mix of electric versus alternative fuel appliance stocks without requiring measurement of stocks. Also, data on appliance stocks were suspected to contain errors of measurement.

This study thus avoids the inappropriate application of city price deflators to state data, avoids the unresolved statistical problems of time series analysis, uses a sample which contains a highly desired wide range of prices and household consumption rates and avoids the necessity of using weak appliance stock data. The analysis was made possible by the acquisition of confidential, unpublished American Gas Association data by city.

Other important unique attributes of the study include the use of a quadratic form for heating degree days, use of a single variable to account for both heating *and* cooling requirements and the use of dummy variables to account for measurement error when missing city price indices were estimated by surrounding cities indices.

A single equation log-linear model was formulated. While it is recognized that a supply-demand, two-equation model is more appropriate, the poor results of previous two-equation studies and the priority to forecast, rather than estimate, structural relationships led to the decision to use a single equation model. Bias in the estimated coefficients is minimized if the error variance of the regression approaches zero. Unusually high coefficients of determination were attained for the demand estimates, leading to the conclusion that most of the remaining error variance was truly random. Neither the lack of a simultaneous model specification nor the exclusion of explanatory variables could cause bias in the estimated model under these circumstances.

The success of the single-equation demand model is probably due to the more accurate deflation of monetary variables than exists in other studies. The use of "real" or constant-purchasing power monetary values across cities (or states, or time) is premised upon economic theory in the absence of either speculative purchasing or "money illusion."

The use of the log-linear functional form circumvented the unresolved debate concerning whether marginal or average prices are appropriate in electricity demand and provided direct estimates of elasticity. The fit of the log-linear models was very good. However, the usual nontransference of statistical properties under nonlinear transformations applies to our demand estimates.

CHAPTER IV. DATA DESCRIPTION

The First Sample

The estimating procedure was undertaken in two stages. The first stage involved the examination of a several alternative measures of the hypothesized causal variables to predict household electricity consumption. A list of the variables tested in the first stage is shown in table 6. The data set described by this list of variables is shown in the appendix. Observations over 102 cities were collected for the first stage investigation. The cities included in the first stage sample are listed on table 7. A number of alternative models were investigated using the 102 city data set. The results of the preliminary investigation led to two major conclusions. First, the specification for the demand equations presented later in this chapter was finalized and, second, a first approximation of a recursive model which could be estimated with recently acquired American Gas Association consumer price data was achieved. The latter research, which relied upon incomplete AGA data, supports further statistical study of a more complex system to explain and predict household energy consumption. A preliminary basis for this further research is presented in Chapter VI.

Once a model appropriate for the prediction of household electricity consumption (given numerous trade-offs and compromises as discussed earlier) had been selected and tested using the 102 city sample, the second stage of the prediction effort could commence. The second stage consisted of the reestimation of the demand curve for household electricity consumption using a newly developed surrogate price index to adjust monetary variables in an expanded 138 city sample. The 138 city sample was more appropriate to the utility service areas for which household electricity consumption forecasts are required. The use of the surrogate deflator price index allowed the expansion of the deflated electricity demand equation estimates from a sample of 57 to the total 138 cities in the second stage sample. The use of deflated cross section data greatly improved the accuracy of the estimated demand equation (as expected from results obtained with the earlier experimentation with the 102 city sample).

The Second Sample

The sample data used to estimate the second stage household electricity demand function are shown in table 8. A short description of the variables follows.

XPD —deflated average household electricity price in 1975

XINCD--deflated per family income in 1975

AGAPD--deflated average household natural gas price in 1975 (data are confidential)

HDD75--heating degree days in 1975

Table 6--List of variables for household electricity demand analysis

Variable	Explanation
AGAP	Gas price from AGA (household) 1975: \$ per million Btu
AGAPP	Propane price from AGA (household) 1975: \$ per million Btu
AGAEP	Electricity price from AGA (household) 1975: \$ per million Btu
AGA02P	#2 Fuel oil price from AGA (household) 1975: \$ per million Btu
AGA01P	#1 Fuel oil price from AGA (household) 1975: \$ per million Btu
AGACP	Coal price from AGA (household) 1975: \$ per million Btu
POPSM	Population/square mile (possible index of apartments with commercial rates)
MEDAGE	Median age: years
MEDINC	Median income: dollars
HUM75	Average humidity at 1 AM for 1975: percent
HDD75	Total heating degree days for 1975: days
CDD75	Total cooling degree days for 1975: days
AVHDD	Average heating degree days for 1941-1970: days
SSPC	Percent of possible sunshine in 1975: percent
AVDB	Temperature exceeded 5% of the time (dry bulb thermometer): F
AVWB	Temperature exceeded 5% of the time (wet bulb thermometer): F
ELEV	Elevation: feet
GP60	Gas price from AGA (household) 1960: cents per therm
02P60	#2 fuel oil price from AGA (household) 1960: cents per gallon
01P60	#1 fuel oil price from AGA (household) 1960: cents per gallon
BCP60	Bituminous coal price from AGA 1960: \$ per ton
ACP60	Anthracite coal price from AGA 1960: \$ per ton
CKP60	Coke price from AGA 1960: \$ per ton
BP60	Butane price from AGA 1960: ¢ per gallon
PP60	Propane price from AGA 1960: ¢ per gallon
KP60	Kerosene price from AGA 1960: ¢ per gallon
EP60	Electricity price from AGA 1960: mills per kWh
NTOT60	Total occupied housing units 1960
NGHF60	Number of houses with gas heat 1960
NOHF60	Number of houses with oil or kerosene heat 1960
NCHF60	Number of houses with coal or coke heat 1960
NEHF60	Number of houses with electric heat 1960
NPHF60	Number of houses with propane heat 1960
NOTHF60	Number of houses with wood or other 1960
NONEHF60	Number of houses with no heat 1960
NGWHF60	Number of houses with gas water heating fuel 1960
NEWHF60	Number of houses with electricity water heating fuel 1960
NCWHF60	Number of houses with coal or coke water heating fuel 1960
NPWHF60	Number of houses with propane water heating fuel 1960
NOWHF60	Number of houses with oil or kerosene water heating fuel 1960
NOTWHF60	Number of houses with wood or other water heating fuel 1960
NONEWHF60	Number of houses with no water heating fuel 1960
NGCF60	Number of houses with gas cooking fuel 1960
NECP60	Number of houses with electricity cooking fuel 1960
NPCF60	Number of houses with propane heating fuel 1960
NOCH60	Number of houses with oil or kerosene cooking fuel 1960
NCCF60	Number of houses with coal or coke cooking fuel 1960
NOTCF60	Number of houses with wood or other cooking fuel 1960
NONECF60	Number of houses with no cooking fuel 1960

Continued

Table 6—List of variables for household electricity demand analysis (continued)

Variable	Explanation
NWRI60	Number of houses with wringer washer 1960
NAUT60	Number of houses with automatic washer 1960
NWD60	Number of houses with washer-dryer combination 1960
NONEW60	Number of houses with no washer 1960
NGD60	Number of houses with gas heated clothes dryer 1960
NED60	Number of houses with electric heated clothes dryer 1960
NONED60	Number of houses with no Clothes dryer 1960
NFF60	Number of houses with one or more food freezers 1960
NONEFF60	Number of houses with no food freezers 1960
N1AC60	Number of houses with one air-conditioner 1960
N2AC60	Number of houses with 2 or more air-conditioners 1960
NCAC60	Number of houses with central air-conditioning 1960
NONEAC60	Number of houses with no air-conditioning 1960
N1TV60	Number of houses with 1 television set 1960
N2TV60	Number of houses with 2 or more television sets 1960
NONETV60	Number of houses with no television sets 1960
TRIND75	Revenue large industrial customers 1975 (FPC electricity)
MUNI75	Dummy indicating municipal retailer of electricity
TEB50075	Typical electric bill for 500 kWh 1975
TEB75075	Typical electric bill for 750 kWh 1975
TEB10007	Typical electric bill for 1000 kWh 1975
NDTOT70	Total number of dwellings 1970
NAC170	Number of dwellings with air-conditioning in 1 room 1970
NAC270	Number of dwellings with air-conditioning in 2 or more rooms 1970
NACC70	Number of dwellings with central air-conditioning
MEDR70	Median rent
NRESI75	Number of residential customers 1975 FPC
NCOM75	Number of commercial customers 1975 FPC
NIND75	Number of industrial customers 1975 FPC
KWHRES75	Residential electric consumption 1975 FPC: thousands of kWh
KWHCOM75	Commercial electric consumption 1975 FPC: thousands of kWh
KWHIND75	Industrial electric consumption 1975 FPC: thousands of kWh
TRRESI75	Revenue residential customers 1975 (FPC electricity)
TRCOM75	Revenue commercial customers 1975 (FPC electricity)
NDWELTOT	Total dwellings 1970
B6970	Dwellings constructed 1969-March 1970
B6568	Dwellings constructed 1965-1968
B6064	Dwellings constructed 1960-1964
B5059	Dwellings constructed 1950-1959
B4049	Dwellings constructed 1940-1949
BEARLY	Dwellings constructed 1930 or Earlier
NTOT70	Total occupied housing units 1970
NGHF70	Number of houses with gas heat 1970
NOHF70	Number of houses with oil or kerosene heat 1970
NCHF70	Number of houses with coal or coke 1970
NWHF70	Number of houses with wood heat 1970
NEHF70	Number of houses with electric heat 1970
NPHF70	Number of houses with propane heat 1970

Continued

Table 6--List of variables for household electricity demand analysis (continued)

Variable	Explanation
NOTHF70	Number of houses with other heat 1970
NONEHF70	Number of houses with no heat 1970
NGWHF70	Number of houses with gas water heating fuel 1970
NOWHF70	Number of houses with oil or kerosene water heating fuel 1970
NCWHF70	Number of houses with coal or coke water heating fuel 1970
NWWHF70	Number of houses with wood water heating fuel 1970
NEWHF70	Number of houses with electricity water heating fuel 1970
NPWHF70	Number of houses with propane water heating fuel 1970
NOTWHF70	Number of houses with other water heating fuel 1970
NONEWHF70	Number of houses with no water heating fuel 1970
NGCF70	Number of houses with gas cooking fuel 1970
NECF70	Number of houses with electricity cooking fuel 1970
NPCF70	Number of houses with propane cooking fuel 1970
NOCF70	Number of houses with oil or kerosene cooking fuel 1970
NCCF70	Number of houses with coal or coke cooking fuel 1970
NWCF70	Number of houses with wood cooking fuel 1970
NOTCF70	Number of houses with other cooking fuel 1970
NONECF70	Number of houses with no cooking fuel 1970
NWR70	Number of houses with wringer washer 1970
NAUT70	Number of houses with automatic washer 1970
NONEW70	Number of houses with no washer 1970
NGD70	Number of houses with gas heated clothes dryer 1970
NED70	Number of houses with electricity heated clothes dryer 1970
NONED70	Number of houses with no clothes dryer 1970
NDW70	Number of houses with dishwasher 1970
NONEDW70	Number of houses with no dishwasher 1970
NFF70	Number of houses with food freezer 1970
NONEFF70	Number of houses with no food freezer 1970
N1TV70	Number of houses with 1 television set 1970
N2TV70	Number of houses with 2 or more television sets 1970
NONETV70	Number of houses with no television sets 1970
S21 through S68	State Dummies
48 dummy variables indicating state of Residence	

Table 7--Cities included in first stage sample

1.	Albuquerque, New Mexico	52.	Lake Charles, Louisiana
2.	Anaheim, California	53.	Lexington, Kentucky
3.	Appleton, Wisconsin	54.	Lincoln, Nebraska
4.	Atlanta, Georgia	55.	Los Angeles, California
5.	Atlantic City, New Jersey	56.	Louisville, Kentucky
6.	Baltimore, Maryland	57.	Phoenix, Arizona
7.	Billings, Montana	58.	Manchester, New Hampshire
8.	Binghamton, New York	59.	Memphis, Tennessee
9.	Birmingham, Alabama	60.	Milwaukee, Wisconsin
10.	Boise, Idaho	61.	Minneapolis, Minnesota
11.	Boston, Massachusetts	62.	Muncie, Indiana
12.	Bridgeport, Connecticut	63.	Nashua, New Hampshire
13.	Buffalo, New York	64.	Nashville, Tennessee
14.	Charleston, West Virginia	65.	New Orleans, Louisiana
15.	Charlotte, North Carolina	66.	New York City, New York
16.	Chicago, Illinois	67.	Newark, New Jersey
17.	Cincinnati, Ohio	68.	Norfolk, Virginia
18.	Cleveland, Ohio	69.	Oklahoma City, Oklahoma
19.	Colorado Springs, Colorado	70.	Omaha, Nebraska
20.	Columbia, Missouri	71.	Orlando, Florida
21.	Columbia, South Carolina	72.	Owensboro, Kentucky
22.	Columbus, Ohio	73.	Peoria, Illinois
23.	Dallas, Texas	74.	Philadelphia, Pennsylvania
24.	Dayton, Ohio	75.	Phoenix, Arizona
25.	Decatur, Illinois	76.	Pittsburgh, Pennsylvania
26.	Denver, Colorado	77.	Pittsfield, Massachusetts
27.	Des Moines, Iowa	78.	Portland, Maine
28.	Duluth, Minnesota	79.	Portland, Oregon
29.	El Paso, Texas	80.	Providence, Rhode Island
30.	Erie, Pennsylvania	81.	Racine, Wisconsin
31.	Evansville, Indiana	82.	Raleigh, North Carolina
32.	Fall River, Massachusetts	83.	Richmond, Virginia
33.	Fargo, North Dakota	84.	Roanoke, Virginia
34.	Fayetteville, North Carolina	85.	Rochester, Minnesota
35.	Flint, Michigan	86.	Rochester, New York
36.	Fort Lauderdale, Florida	87.	St. Louis, Missouri
37.	Fort Wayne, Indiana	88.	Salt Lake City, Utah
38.	Fort Worth, Texas	89.	San Antonio, Texas
39.	Galveston, Texas	90.	San Diego, California
40.	Great Falls, Montana	91.	San Francisco, California
41.	Green Bay, Wisconsin	92.	San Jose, California
42.	Greenville, South Carolina	93.	Scranton, Pennsylvania
43.	Harrisburg, Pennsylvania	94.	Seattle, Washington
44.	Hartford, Connecticut	95.	Sioux City, Iowa
45.	Houston, Texas	96.	Sioux Falls, South Dakota
46.	Indianapolis, Indiana	97.	Springfield, Massachusetts
47.	Jackson, Mississippi	98.	Topeka, Kansas
48.	Kansas City, Missouri	99.	Tucson, Arizona
49.	Knoxville, Tennessee	100.	Washington, District of Columbia
50.	Lafayette, Indiana	101.	Waterbury, Connecticut
51.	Lafayette, Louisiana	102.	Wilmington, Delaware

Table 8--Sample data used to estimate second stage electricity demand function

	XPD	XQN	XINCD	AGAPD*	HDD75	XPINA	XPI	SPI	TRDN
1	29.7230	9.9536	8288.0	(Confidential)	1437.0	1	---	0.7786	296.0
2	32.9260	12.8434	9853.0		820.0	1	---	0.8300	423.0
3	32.9260	12.8434	9853.0		820.0	1	---	0.8300	423.0
4	47.3960	6.9727	8942.0		1110.0	1	---	0.8287	330.0
5	46.1950	5.5733	13065.0		877.0	0	0.8395	---	257.0
6	41.4310	4.6002	13065.0		877.0	0	0.8395	---	191.0
7	35.2880	5.5627	11026.0		3556.0	0	0.8139	---	196.0
8	41.6420	5.2390	13237.0		3398.0	0	0.8139	---	218.0
9	35.3880	5.5627	11026.0		3556.0	0	0.8139	---	196.0
10	46.7080	7.6470	6790.0		2531.0	1	---	0.8545	357.0
11	44.9720	8.3964	10565.0		1998.0	0	0.8784	---	378.0
12	47.8620	11.3940	11746.0		246.0	0	0.7562	---	545.0
13	47.8620	11.3940	11746.0		246.0	0	0.7562	---	545.0
14	41.5830	9.8173	13655.0		1574.0	0	0.7831	---	408.0
15	36.4610	7.8598	10641.0		333.0	1	---	0.8554	287.0
16	36.7270	7.7540	11877.0		2932.0	0	0.8690	---	285.0
17	43.3870	6.4232	13734.0		3350.0	0	0.8685	---	279.0
18	36.7270	7.7540	11877.0		2932.0	0	0.8690	---	285.0
19	36.7270	7.7540	11877.0		2932.0	0	0.8690	---	285.0
20	26.9120	10.3033	11007.0		3347.0	1	---	0.8455	277.0
21	26.9120	10.3033	9556.0		2976.0	1	---	0.8455	277.0
22	28.6940	8.9790	8981.0		2380.0	1	---	0.7919	258.0
23	29.0650	8.7243	12888.0		2976.0	0	0.8342	---	254.0
24	43.3870	6.4232	13734.0		3350.0	0	0.8685	---	279.0
25	27.3060	9.4787	10118.0		2976.0	1	---	0.8572	259.0
26	28.6940	8.9790	8981.0		2380.0	1	---	0.7919	258.0
27	38.0010	7.3596	8979.0		3957.0	1	---	0.8507	280.0
28	37.1640	7.9600	10689.0		3529.0	1	---	0.8451	296.0
29	36.4610	7.8598	10641.0		3333.0	1	---	0.8554	287.0
30	37.1640	7.9600	10689.0		3529.0	1	---	0.8451	296.0
31	38.0010	7.3596	8979.0		3957.0	1	---	0.8507	280.0
32	36.4610	7.8598	10641.0		3333.0	1	---	0.8554	287.0
33	37.1640	7.9600	10689.0		3529.0	1	---	0.8451	296.0
34	31.9210	8.5783	9605.0		2884.0	1	---	0.8193	274.0

Continued

Table 8--Sample data used to estimate second stage electricity demand function (continued)

	XPD	XQN	XINCD	AGAPD*	HDD75	XPINA	XPI	SPI	TRDN
35	30.0440	7.8668	9658.0		2889.0	1	---	0.8219	236.0
36	30.0440	7.8451	9658.0		2889.0	1	---	0.8219	236.0
37	42.0510	8.1660	12853.0		2953.0	0	0.8219	---	343.0
38	29.8550	6.5908	8626.0		2380.0	1	---	0.7874	197.0
39	30.4570	8.2466	9595.0		2492.0	1	---	0.7995	251.0
40	29.8550	6.5908	8626.0		2380.0	1	---	0.7874	197.0
41	29.8950	9.2192	8668.0		2509.0	1	---	0.8202	276.0
42	30.4570	8.2466	9595.0		2492.0	1	---	0.7995	251.0
43	24.0440	8.0718	9808.0		2249.0	1	---	0.7944	194.0
44	29.8550	6.5908	8626.0		2380.0	1	---	0.7874	197.0
45	50.5150	6.7439	12559.0		2334.0	0	0.8417	---	341.0
46	29.8950	9.2192	9141.0		2252.0	1	---	0.8199	276.0
47	51.0300	4.4876	8914.0		3118.0	1	---	0.9673	229.0
48	48.3140	5.7001	9927.0		3118.0	1	---	0.9673	275.0
49	42.7200	6.8364	12871.0		3579.0	0	0.8679	---	292.0
50	22.4130	12.7576	13244.0		3271.0	0	0.8607	---	286.0
51	42.7200	6.8364	12871.0		3579.0	0	0.8679	---	292.0
52	42.7200	6.8364	12871.0		3579.0	0	0.8679	---	292.0
53	37.5680	7.2106	8904.0		5575.0	1	---	0.8545	271.0
54	39.6210	6.7360	13450.0		4484.0	0	0.8683	---	267.0
55	34.4030	6.7360	9599.0		5105.0	1	---	0.8584	232.0
56	34.4030	6.7360	9320.0		4419.0	1	---	0.8517	232.0
57	34.4030	6.7360	9599.0		5105.0	1	---	0.8584	232.0
58	37.5680	7.2106	8904.0		5575.0	1	---	0.8545	271.0
59	30.4440	10.1983	8134.0		1189.0	1	---	0.7985	310.0
60	42.0510	8.1660	12853.0		2953.0	0	0.8219	---	343.0
61	31.9210	8.5783	9605.0		2884.0	1	---	0.8193	274.0
62	31.9210	8.5783	9605.0		2884.0	1	---	0.8193	274.0
63	31.9210	8.5783	9605.0		2884.0	1	---	0.8193	274.0
64	42.0510	8.1660	12853.0		2953.0	0	0.8219	---	343.0
65	31.9210	8.5783	9605.0		2884.0	1	---	0.8193	274.0
66	39.0040	8.5783	12824.0		2695.0	0	0.8184	---	335.0
67	31.9210	8.5783	9605.0		2884.0	1	---	0.8193	274.0

Continued

Table 8--Sample data used to estimate second stage electricity demand function (continued)

	XPD	XQN	XINCD	AGAPD*	HDD75	XPINA	XPI	SPI	TRDN
68	24.0320	6.7485	8966.0		4368.0	1	---	0.8390	162.0
69	24.0320	6.7485	8952.0		4756.0	1	---	0.8390	162.0
70	23.1580	8.0564	9770.0		3641.0	1	---	0.8405	187.0
71	27.2450	9.7803	10201.0		3452.0	1	---	0.8428	266.0
72	32.9260	12.8434	9853.0		820.0	1	---	0.8297	423.0
73	46.4780	6.9044	9771.0		4205.0	1	---	0.9337	321.0
74	46.4780	6.9044	10960.0		4205.0	1	---	0.9337	321.0
75	46.9160	7.0179	8767.0		2714.0	1	---	0.8545	329.0
76	56.1880	5.2005	12245.0		2585.0	0	0.9673	---	292.0
77	33.0290	5.8811	9027.0		2713.0	1	---	0.8041	194.0
78	34.6160	6.0966	7790.0		1529.0	1	---	0.8077	211.0
79	35.2220	6.2260	11965.0		3526.0	1	---	0.9007	219.0
80	32.5890	6.9422	10028.0		3930.0	1	---	0.9367	226.0
81	37.4910	6.3339	11569.0		3530.0	0	0.9001	---	237.0
82	38.1050	11.0941	11623.0		1839.0	0	0.8221	---	423.0
83	30.0230	11.2373	9829.0		1660.0	1	---	0.8065	337.0
84	24.0320	6.7485	8966.0		4368.0	1	---	0.8390	162.0
85	34.4030	6.7360	9320.0		4419.0	1	---	0.8517	232.0
86	34.4030	6.7360	9599.0		5105.0	1	---	0.8584	232.0
87	39.2420	8.3218	12668.0		2489.0	0	0.8096	---	327.0
88	22.4130	12.7576	13244.0		3271.0	0	0.8607	---	286.0
89	39.7760	7.3900	10458.0		2936.0	1	---	0.7846	294.0
90	44.1740	8.8686	14318.0		2883.0	0	0.7846	---	392.0
91	39.2420	8.3218	12668.0		2489.0	0	0.8096	---	327.0
92	22.4130	12.7576	13244.0		3271.0	0	0.8607	---	286.0
93	22.4130	12.7576	13244.0		3271.0	0	0.8607	---	286.0
94	39.7760	7.3900	10458.0		2936.0	1	---	0.7846	294.0
95	22.4130	12.7576	13244.0		3271.0	0	0.8607	---	286.0
96	44.1740	8.8686	14318.0		2883.0	0	0.7846	---	392.0
97	24.1850	9.6728	9337.0		2075.0	1	---	0.8018	234.0
98	56.5340	5.5715	12065.0		3151.0	0	0.8064	---	315.0
99	38.8780	8.5284	12047.0		2802.0	0	0.8258	---	332.0
100	49.4140	6.5893	9362.0		3271.0	1	---	---	326.0
101	49.4140	6.5893	9362.0		3271.0	1	---	0.8804	326.0
102	38.8780	8.5284	12047.0		2802.0	0	0.8258	---	332.0
103	32.1050	8.5284	8397.0		3105.0	1	---	0.9481	274.0

Continued

Table 8--Sample data used to estimate second stage electricity demand function (continued)

	XPD	XQN	XINCD	AGAPD*	HDD75	XPINA	XPI	SPI	TRDN
104	56.9750	6.5893	12429.0		2436.0	0	0.8673	---	375.0
105	56.5340	5.5715	12065.0		3151.0	0	0.8064	---	315.0
106	30.0230	11.2373	8632.0		1680.0	1	---	0.7941	337.0
107	36.7570	10.9704	8616.0		1217.0	1	---	0.8026	403.0
108	20.2610	16.6435	8199.0		1901.0	1	---	0.7868	337.0
109	22.0040	11.8511	8543.0		1601.0	1	---	0.7775	261.0
110	21.7910	18.3418	11865.0		1841.0	0	0.7741	---	400.0
111	29.3510	12.3524	13118.0		1260.0	0	0.7697	---	363.0
112	29.3510	12.3524	13118.0		1260.0	0	0.7697	---	363.0
113	29.3510	12.3524	13118.0		1260.0	0	0.7697	---	363.0
114	28.2260	7.8361	9951.0		3329.0	1	---	0.8391	221.0
115	38.8380	10.0930	10028.0		2051.0	1	---	0.8505	392.0
116	38.8380	10.0930	8704.0		1759.0	1	---	0.8803	392.0
117	29.8950	9.2192	9141.0		2252.0	1	---	0.8199	276.0
118	29.8950	9.2192	8668.0		2509.0	1	---	0.8202	276.0
119	29.8950	9.2192	8668.0		2509.0	1	---	0.8202	276.0
120	28.7270	6.9019	10969.0		4484.0	1	---	0.8683	198.0
121	34.0880	7.1584	12581.0		3900.0	0	0.9007	---	244.0
122	34.0880	7.1584	12581.0		3900.0	0	0.9007	---	244.0
123	34.0880	7.1584	12172.0		3900.0	0	0.9007	---	244.0
124	32.2400	8.2433	12801.0		4423.0	0	0.8353	---	266.0
125	47.1620	6.5502	12331.0		4423.0	0	0.8353	---	309.0
126	17.7340	14.1395	9531.0		4026.0	1	---	0.8640	251.0
127	11.7390	12.8336	13507.0		2645.0	0	0.8640	---	151.0
128	84.7820	3.3002	1129.0		2545.0	0	0.9673	---	280.0
129	56.9750	6.5893	12429.0		2436.0	0	0.8673	---	375.0
130	46.9160	7.0179	8767.0		2714.0	1	---	0.8545	329.0
131	34.4030	6.7360	9320.0		4419.0	1	---	0.8517	232.0
132	17.1570	13.0818	9710.0		3271.0	1	---	0.8390	224.0
133	11.7390	12.8336	13507.0		2645.0	0	0.8640	---	151.0
134	17.1570	13.0818	9710.0		3271.0	1	---	0.8390	224.0
135	35.1390	6.2486	10458.0		4026.0	1	---	0.8640	220.0
136	11.7390	12.8336	13507.0		2645.0	0	0.8640	---	151.0
137	11.7390	12.8336	13507.0		2645.0	0	0.8640	---	151.0
138	11.7390	12.8336	13507.0		2645.0	0	0.8640	---	151.0

*American Gas Association data is confidential.

XPINA--a unit dummy variable which indicates those cities for which the surrogate price deflator must be used

XPI --the price deflator

SPI --the surrogate price deflator

TRDN--actual deflated spending per family for household electricity

Although not used directly in the statistical analysis the rather large expenditure variation by city is revealing. Average real spending (by city), per family for household electricity in 1975, varied from \$151 to \$545. It is the task of the econometric model to explain this variation.

Table 9 shows the means and standard deviations of the variables included in the stage two regression equations. A rather large variability can be noted in both the deflated average electricity price across cities and in the electricity consumption per family. In each case, the standard deviation is more than one quarter of the mean value. The large variation in the demand variables (deflated electricity price and consumption per family) implies that the cross section data reflects the desired long run comparison (in which the sample data include a wide range of price-quantity sets). The large variation in the sample data is desired because future forecasts will not require extrapolating as far beyond the range of the sample data as would be the case if the less variable time series sample data were used. It is also easily shown also that large variation in the dependent variable results in less sensitivity of the estimated equation to slight errors in the independent

Table 9--Means and standard deviations of sample data used in regression estimation*

Variable	Mean	Standard Deviation
Deflated Electricity Price \$/Thousand kWh (Avg. 1975)	38.6370	10.5864
Electricity Consumption Per Family, Thousand kWh/year (1975)	8.6055	2.5323
Deflated Income Per Household \$/Year (1975)	11,853.88	1,136.27
Deflated Natural Gas Price \$/Million BTU (Avg. 1975)	1.9413	0.6177
Heating Degree Days (1975)	2,915.93	1,041.22
Heating Degree Days Squared	9,578,923.8	6,193,885.3

*Sample data include 57 observations which are deflated using cross-city cost of living indices and 81 observations deflated by surrogate price indices calculated from nearby cities. State dummy variables are not shown.

variables. The increased robustness of the estimated model is a further desired outcome. Natural gas prices also show extreme variation among cities (the standard deviation is almost one-third of the mean). High variation in the sample natural gas price data is particularly desirable since DOE forecasts of future consumer energy prices show that natural gas prices are expected to grow very rapidly.

CHAPTER V. FINAL DEMAND EQUATION AND PREDICTION METHODOLOGY

Six equations are presented in the second stage of the empirical investigation. All of the final equations may be described as log-linear in the monetary variables with quadratic terms included to show the effect of heating degree days on household electricity consumption. Since part of the data were deflated using actual city price deflators and part were deflated using surrogate deflators, separate and pooled regressions are presented to allow some adjustment for any bias resulting from the inclusion of surrogate deflators. The general form of the estimated demand equations is shown in both the log--linear form (the form estimated by computer using the linear regression technique) and the equivalent product equation form. While the log-linear form is necessary to apply the linear regression technique to estimate the equation coefficients, the product form is commonly referred to in discussions. As is well known, the exponents K_1 through K_6 represent the elasticities of the variables to which they are attached. For example, K_1 indicates the price elasticity of demand for the variable electricity price (deflated by the price index). Similarly, the coefficient K_2 indicates the price elasticity estimated in cities where the surrogate price deflator was required. Coefficients K_3 and K_4 show the respective income elasticities of demand and coefficients K_5 and K_6 show the respective cross elasticities of electricity sales to natural gas price. Since the heating degree days variable is of quadratic, rather than log-linear form, no direct elasticity interpretation of coefficients K_7 and K_8 is possible. The variables \emptyset and $1-\emptyset$ appear in the equations as a means of statistically identifying the elasticities estimated for cities with real price deflators and those with surrogate price deflators. The variable \emptyset takes the value of unity when the real deflator log-linear version of the demand equation reveals that the \emptyset and $1-\emptyset$ variables are premultiplied by each of the independent monetary variables. Thus, when only a surrogate deflator is available, the first term observation (following K_1) is zero. If the real deflator is available, the second term observation (following K_2) is zero. In this manner, separate estimates of price, income, and cross elasticity are provided for cities with each type of deflator. The use of a dummy variable indicating a real or surrogate deflator is not required for the HDD variable since it is a nonmonetary variable not requiring adjustment to a common measure. The equation in log-linear form is

$$\begin{aligned} \ln \frac{\text{kWh per year}}{\text{customer}} = & K_0 + K_1 (\emptyset) \ln \frac{P_e}{P_I} + K_2 (1-\emptyset) \ln \frac{P_e}{S P_I} \\ & + K_3 (\emptyset) \ln \frac{I}{P_I} + K_4 (1-\emptyset) \ln \frac{I}{S P_I} \\ & + K_5 (\emptyset) \ln \frac{P_{ng}}{P_I} + K_6 (1-\emptyset) \ln \frac{P_{ng}}{S P_I} \\ & + K_7 \text{HDD} + K_8 (\text{HDD})^2 + \sum_{i=1}^{48} d_i S_i . \end{aligned}$$

The equation in product form is

$$\frac{\text{kWh}}{\text{customer}} = B_0 \frac{P_e}{PI}^{\emptyset K_1} \frac{P_e}{SPI}^{(1-\emptyset)K_2} \frac{I}{PI}^{\emptyset K_3} \frac{I}{SPI}^{(1-\emptyset)K_4} \frac{P_{ng}}{PI}^{\emptyset K_5} \frac{P_{ng}}{SPI}^{1-\emptyset K_6} e^{K_7 \text{HDD} + K_8 (\text{HDD})^2} + \sum_{i=1}^{48} d_i S_i$$

The Demand Models

Six demand equations are presented in the following tables. Each of the models fits the data well (the coefficient of determination varies from .842 to 0.978). A coefficient of determination in the 90 percent range is extremely good for cross section data which excludes most spurious correlation often caused by contemporaneous trends in economic time series data. In fact, a higher correlation may be suspect since measurement error is known to exist and part of the variation in consumer purchases may be truly random and not susceptible to prediction.

Model I (table 10) is the subsample of 57 cities for which the actual price deflator data are available. Regressions on the data which are deflated by the actual price deflator tend to fit more precisely than do the regressions where the surrogate deflator is required. (When no deflation at all is used the fit of the estimated equations falls drastically.) Model II (table 11) is similar to Model I except that it is applied to the sample data of 81 cities where the surrogate deflator is required. The R^2 falls from .95 to .842, partly, because of measurement error when the deflation is accomplished with the surrogate deflator. Models I and II incorporate dummy variables which shift the demand equation up or down to adjust for variation among states in the rate of household electricity consumption. The state dummy variables are included to adjust for geographic market or climatic factors for which more specific data are unavailable. The inclusion of dummy variables does not add to the forecasting difficulty usually encountered when the set of independent variables is enlarged. No prediction error exists for this type of variable.

The earlier analysis of specification error suggests some of the serious difficulties involved with the model-building process. If we are unsure of which explanatory variables ought to appear in a model, we face several tradeoffs. The cost of excluding a variable which should appear in the model is bias and inconsistency. If the number of observations available is rather large, it seems reasonable to opt for the risk of adding irrelevant variables because the loss of degrees of freedom associated with the addition of several independent variables to the model is unlikely to be serious. If all potential model variables are known, the choice of model form must be made in terms of the bias-efficiency trade-off with the result dependent upon our objectives. If accurate forecasting is the goal, minimizing mean square error appears to be one reasonable objective since it accounts for both bias and efficiency (Mean Square Error = Variance + (bias)²). Thus, in principle, we might estimate each of several alternative models and compare the mean square errors associated with each model.

Table 10--Demand Model I

Residential Electricity Demand: Subsample with Real Price Deflator

Dependent Variable: Log Transform of kWh per customer per year

Sample Size: 57 SMSA's for the year 1975

Functional Form: Log linear with quadratic term for weather

Deflation of monetary variables: Prices and income deflated with a price index

Coefficient of Determination: $R^2 = 0.950$ (adjusted)

<u>Independent Variables</u>	<u>Estimated Coefficient</u>	<u>t-Value</u>
Electricity Price deflated by a price index (log transform)	-0.843	- 17.05
Income deflated by a price index (log transform)	0.634	28.89
Natural Gas Price deflated by a price index (log transform)	-0.144	- 2.18
Heating Degree Days	-0.000338	- 6.88
Heating Degree Days Squared	0.0000000294	3.21
State Dummy Variables:		
New York S28	-0.141	- 2.33
Pennsylvania S29	0.074	1.91
Tennessee S54	0.202	2.38
Texas S58	-0.226	- 3.64
Colorado S60	-0.401	- 5.80
California S66	-0.835	-12.97
Washington S68	-0.575	- 7.49
Constant Term	Excluded	Excluded

Table 11--Demand Model II

Residential Electricity Demand: Subsample with Surrogate Price Deflator

Dependent Variable: Log transform of kWh per customer per year

Sample Size: 81 SMSA's for the year 1975

Functional Form: Log linear with quadratic term for weather

Deflation of monetary variables: Prices and income deflated with a surrogate price index

Coefficient of Determination: $R^2 = 0.842$ (adjusted)

<u>Independent Variables</u>	<u>Estimated Coefficient</u>	<u>t-Value</u>
Electricity Price deflated by surrogate price index (log transform)	-0.689	-11.69
Income deflated by surrogate price index (log transform)	0.564	21.75
Natural Gas Price deflated by surrogate price index (log transform)	0.175	4.76
Heating Degree Days	-0.000362	- 7.00
Heating Degree Days Squared	0.0000000338	4.10
State Dummy Variables:		
Massachusetts S22	-0.342	- 3.42
New Hampshire S24	0.130	1.80
New York S28	-0.188	- 2.76
Pennsylvania S29	0.149	2.47
Iowa S35	0.204	3.97
Minnesota S37	0.086	1.23
Deleware. S43	0.285	2.85
Kentucky S52	-0.215	- 5.18
Tennessee S54	0.151	2.10
Texas S58	-0.417	- 4.35
New Mexico S63	-0.269	- 2.81
Constant Term	Excluded	Excluded

In terms of classical statistics, it is not difficult to test whether irrelevant variables are present. Since the coefficients of irrelevant variables have expected values of 0, we need simply apply standard tests if we wish to evaluate the relevancy of individual variables. Such testing is feasible if we know the set of variables which might conceivably appear in the model but it fails completely when we are ignorant to the underlying causation.

Model III (table 12) combines the sample data included in Models I and II for a sample size of 138 cities. Dummy variables are used in the manner described earlier to allow pooling of the data while providing separate elasticity estimates for monetary variables deflated by real and surrogate price indices. The R^2 of .903 falls between that of the first two models as might be expected. The elasticity estimates are very similar to those found in the two separate regressions in Model I and Model II. It is noteworthy that an anomaly appears in the demand functions for the cross elasticity of electricity demand to the price of natural gas deflated by the actual price index. In cities where a real price deflator is available the data indicate that high prices for natural gas are associated with a lower per family consumption of electricity. The sign of this variable is "wrong" if natural gas is to be considered as a substitute, rather than a complement, to electricity. This theoretically unexpected finding has also been reported in several previous studies.(20) This serious error in estimation is removed in Model VI (table 13). Model VI does not differentiate among "real" or "surrogate" price deflators. Also, a second weather variable, humidity, is included. Model VI also is adjusted for heteroscedasticity by dividing all variables by the square root of real income per household. The resulting demand equation has an adjusted R^2 of 90 percent. All variables in Model VI have the correct sign for their estimated coefficients.

Models IV and V (tables 14 and 15, respectively) are similar to Models I and II except that the stepwise regression program was calibrated to allow state price elasticity dummy variables to enter after (usually) the entry of the state dummy shift variables. In terms of the log-linear form of the model, this allows both the intercept and the slope coefficients to vary by state. Inclusion of both effects tends to lead to high correlation among independent variables and possible estimation errors. Price elasticity dummy variables with high intercorrelations with the shift dummy variables were excluded from the regressions. Further experimentation to extend the elasticity dummy variables to natural gas prices is warranted given the unexpected sign estimated for the cross elasticity discussed earlier.

Although Models IV and V incorporate several added independent variables which adjust for cross state variation in price elasticity of demand, the net addition to the explanation is quite small. Model I has an R^2 of 0.95 which rises to 0.978 in Model IV. Model II has an R^2 of .842 which rises to .869 in Model V. The added price elasticity variables are nominally statistically significant but the high intercorrelations reduce the credibility of continued additions of dummy variables to the models. The forecasts will be little affected by the inclusion of the elasticity adjusting dummy variables.

Model VI, which pools the two data sets contained in Models I and II, has been selected as the prediction equation best suited to provide consumption forecasts for 136 utility service areas. Although the R^2 for Model VI is slightly less than for Model I or Model IV, these models exclude 81

Table 12--Demand Model III

Residential Electricity Demand: Total sample (model combining subsample with surrogate deflators and subsample with real deflators)

Dependent Variable: Log-transform of kWh per customer per year

Sample Size: 138 SMSA's for the year 1975

Functional Form: Log-linear with quadratic term for weather

Deflation of monetary variables: Prices and income deflated by a price index or a surrogate price index

Coefficient of Determination: $R^2 = 0.903$ (adjusted)

<u>Independent Variables</u>	<u>Estimated Coefficient</u>	<u>t-Value</u>
Electricity Price Deflated by Price Index (log transformation)	-0.856	-16.67
Electricity Price Deflated by Surrogate Price Index (log trans.)	-0.655	-13.15
Income Deflated by Price Index (log transformation)	0.644	30.85
Income Deflated by Surrogate Price Index (log transformation)	0.552	26.52
Natural Gas Price Deflated by Price Index (log transformation)	-0.170	- 2.43
Natural Gas Price Deflated by Surrogate Price Index (log trans.)	0.177	5.35
Heating Degree Days	-0.000373	-11.08
Heating Degree Days Squared	0.0000000368	6.86
State Dummy Variables:		
Massachusetts S22	-0.360	- 3.89
New York S28	-0.162	- 3.47
Pennsylvania S29	0.103	3.00
Iowa S35	0.192	4.20
Deleware S43	0.269	2.92
Kentucky S52	-0.212	- 5.51
Tennessee S54	0.179	3.24
Texas S58	0.286	5.39
Colorado S60	-0.425	- 5.49
New Mexico S63	-0.271	- 3.04
California S66	-0.842	-12.30
Washington S68	-0.577	- 6.99
Constant Term	Excluded	Excluded

Table 13--Demand Model VI

Residential Electricity Demand: Total sample (no adjustment for variation between coefficients estimated on variables deflated by "real" versus "surrogate" price indices)

Dependent Variable: Log-transform of kWh per customer per year

Sample Size: 138 SMSA's for the year 1975

Functional Form: Log-linear with quadratic term for weather

Deflation of monetary variables: Prices and income deflated by a price index or a surrogate price index

Coefficient of Determination: $R^2 = .906$ (adjusted)

<u>Independent Variables</u>	<u>Estimated Coefficient</u>	<u>t-Value</u>
Electricity Price deflated by real or surrogate price indices	-0.718	-19.05
Income deflated by real or surrogate price indices	0.345	11.85
Natural Gas Price deflated by real or surrogate price indices	0.102	2.811
Heating Degree Days	-0.000209	- 0.610
Heating Degree Days Squared	0.0000000172	3.16
Humidity	0.440	8.296
State Dummy Variables:		
Massachusetts S22	-3.564	- 4.01
Rhode Island S25	-2.073	- 2.30
New York S28	-2.764	- 6.14
Illinois S30	-0.839	- 2.57
Michigan S32	-1.029	- 2.01
Wisconsin S34	-1.153	- 2.82
Iowa S35	1.487	3.39
Deleware S43	2.489	2.85
Kentucky S52	-2.136	- 5.72
Tennessee S54	1.746	3.24
Arizona S59	6.435	8.72
Idaho S61	1.766	2.31
California S66	-6.519	- 9.53
Washington S68	-5.00	- 7.50
Constant Term	Excluded	Excluded

Table 14--Demand Model IV

Residential Electricity Demand: Subsample with real price deflators
(model with price elasticity dummy variables)

Dependent Variable: Log-transform of kWh per customer per year

Sample Size: 57 SMSA's for the year 1975

Functional Form: Log-linear with quadratic term for weather

Deflation of monetary variables: Prices and income deflated with a
price index

Coefficient of Determination: $R^2 = 0.978$ (adjusted)

<u>Independent Variables</u>		<u>Estimated Coefficient</u>	<u>t-Value</u>
Electricity Price deflated by a price index (log transformation)		-0.782	-19.67
Income deflated by a price index (log transformation)		0.614	35.75
Natural Gas Price deflated by a price index (log transformation)		-0.177	- 2.97
Heating Degree Days		-0.000471	-12.06
Heating Degree Days Squared		0.0000000615	7.82
State Dummy Variables:			
New York	S28	-0.072	- 1.69
Pennsylvania	S29	0.168	5.67
Minnesota	S37	-0.096	- 1.62
Tennessee	S54	0.367	5.87
Texas	S58	-0.115	- 2.38
Colorado	S60	-0.368	- 6.32
California	S66	-0.761	-17.00
Washington	S68	-0.375	- 5.78
Price Elasticity Dummy Variables:			
Michigan	PS32	0.018	2.04
Ohio	PS33	0.043	5.58
Mississippi	PS38	0.031	3.18
District of Columbia	PS42	0.074	4.93
Maryland	PS46	0.031	2.11
South Carolina	PS47	0.081	5.35
Constant Term		Excluded	Excluded

Table 15--Demand Model V

Residential Electricity Demand: Subsample with surrogate price deflator
(model with price elasticity dummy variables)

Dependent Variable: Log transform of kWh per customer per year

Sample Size: 81 SMSA's for the year 1975

Functional Form: Log linear with quadratic term for weather

Deflation of monetary variables: Prices and income deflated with a
surrogate price index

Coefficient of Determination: $R^2 = 0.869$ (adjusted)

<u>Independent Variables</u>		<u>Estimated Coefficient</u>	<u>t-Value</u>
Electricity Price deflated by surrogate price index (log transformation)		-0.687	-12.31
Income deflated by surrogate price index (log transformation)		0.563	22.84
Natural Gas Price deflated by surrogate price index (log transformation)		0.164	4.51
Heating Degree Days		-0.000365	- 8.12
Heating Degree Days Squared		0.0000000370	5.40
State Dummy Variables:			
Massachusetts	S22	-0.350	- 3.78
New Hampshire	S24	0.096	1.47
New York	S28	-0.212	- 3.40
Pennsylvania	S29	0.132	2.39
Iowa	S35	0.174	3.67
Deleware	S43	0.280	3.05
Kentucky	S52	-0.221	- 5.82
Tennessee	S54	0.151	2.29
Texas	S58	-0.413	- 4.71
New Mexico	S63	-0.279	- 3.19
Price Elasticity Dummy Variables:			
Rhode Island	PS25	-0.059	- 2.50
Montana	PS62	-0.049	- 2.83
Constant Term		Excluded	Excluded

observations on cities where a "surrogate" deflator was required. Model VI has an R^2 equal to that of Model III which included the total 138 observation sample with adjustment for "real" or "surrogate" deflators. Model VI is superior to Model III which estimated the wrong sign for natural gas prices deflated by the "real" price index. The use of weighted least squares to adjust for heteroscedasticity increased the efficiency of Model VI. A second weather variable, humidity, was also significant in Model VI. All signs of estimated coefficients in Model VI were of the theoretically correct sign and reasonable in magnitude. Given the "noise" present in the data deflated by "surrogate" price indices, an R^2 of 90 percent is extremely good for a cross section regression estimate. The required historical data and projected data inputs and the resulting econometric model and consumption forecasts are summarized in Figure 5.

Comparison of Elasticity Estimates

The cross section regression results presented in Tables 2 and 3 are the most appropriate models to compare with Model VI. The seven cross section models have price elasticities varying from -0.85 to -1.33. The simple average of the ten estimates (some studies provide a range of estimates) is -1.03. Our price elasticity estimate of -0.72 is slightly lower than any of the previous estimates. Cross elasticity estimates to natural gas price vary from -0.31 to +0.31. Excluding the estimate with the wrong sign, the average of the cross elasticity estimates is 0.207. Previous cross elasticity estimates are also higher than our estimate of 0.10. Previous income elasticity estimates vary from -0.46 to 1.13, with an average (excluding the estimate with the wrong sign) of 0.59. Our income elasticity estimate of 0.35 is below the average of other pure cross section models.

Although our elasticity estimates tend to be smaller in absolute value than previous cross section estimates, few of the cross section estimates differ markedly (excluding those with wrong signs). Several factors could account for our smaller elasticity estimates. Previous studies used data for 1969 or 1970; or in one case 1959, 1965 and 1970; whereas our data are for 1975. Some models measured electricity price differently although no systematic effect on the size of the elasticity estimates could be distinguished. Some previous models failed to deflate the monetary variables and the quality of most deflators is poor. Our natural gas price data are from a source not previously utilized (confidential AGA data). Our model contained several more independent variables than previous studies. Our Model VI may also be contrasted with our Models I-V. Generally our Models I-V have higher elasticity estimates more closely resembling the other cross section studies discussed above. The inclusion of an additional weather variable and the use of weighted least squares distinguish our Model VI from both Models I-V and earlier studies. Specification bias is a possible cause of the higher elasticity estimates found in models containing fewer significant explanatory variables. In any event, the range of cross section estimators is relatively small.

The range of elasticity results when pure time series or pooled cross section and time series data sets were previously compared and shown previously in table 4.

<u>HISTORICAL DATA INPUT BY CITY (AND SOURCE)</u>	<u>PROJECTED DATA INPUT BY CITY (AND SOURCE)</u>
1975 Electricity Consumption Per Customer (FERC)	Percent Change in Avg. Price of Electricity (DOE)
1975 Deflated Average Price of Electricity (FERC)	Percent Change in Avg. Price of Natural Gas (DOE)
1975 Deflated Average Natural Gas Price (AGA)	Percent Change in Personal Income per Capita (OBERS)
1975 Deflated Personal Income Per Capita (CENSUS)	Long-Run Average Heating Degree Days (NOAA)
1975 Heating Degree Days (NOAA)	Projected Number of Customers Based on OBERS
Dummy Variables for State	Population Projections
<div> <div>KEY</div> <div> kWh-Kilowatt Hours Pe-Avg Residential Electricity Price I-Personal Income Per Capita Png-Avg. Residential Natural Gas Price HDD-Heating Degree Days Si-Dummy Variables for States PI-Price Index for City SPI-Surrogate Price Index (Nearby Cities) Ø -one if PI is available, zero otherwise </div> </div>	
<u>Multiple Regression Demand Equation Estimated</u>	<u>Projected Electricity Consumption By City</u>
$\ln \frac{\text{kWh per year}}{\# \text{ customers}} = K_0 + K_1 (\emptyset) \ln \frac{Pe}{PI} + K_2 (1-\emptyset)$ $\ln \frac{Pe}{SPI} + K_3 (\emptyset) \ln \frac{I}{PI} + K_4 (1-\emptyset) \ln \frac{I}{SPI} + K_5 (\emptyset)$ $\ln \frac{Png}{PI} + K_6 (1-\emptyset) \ln \frac{Png}{SPI} + K_7 HDD + K_8 (HDD) +$	138 Service Areas-105 Cities (K ₁ through K ₆ are elasticities)

$$48 \sum_{i=1}^i d_i S_i$$

Figure 5--Summarization of econometric model and consumption forecasts.

Independent Variable Extrapolation Projection of Electricity Price

The 1985 Series C electricity price (in 1978 dollars) is projected by the Department of Energy by region. The projections assume no natural gas regulation and an oil import price of only \$15.00. It was necessary to divide all 1985 prices by 1.19 (Gross National Product implicit deflator) to adjust them to 1975 dollars (reversing the adjustment made by DOE).

The DOE electricity price projections were made for 10 regions: New England, New York-New Jersey, Mid-Atlantic, South Atlantic, Midwest, Southwest, Central, North Central, West and Northwest. Table 16 shows the states contained in each of the above regions and Table 17 shows the sample cities used to estimate the electricity demand equation and the cities for which projections are required.

Historical prices for the same regions were provided by the DOE for 1975. Key assumptions made by DOE are shown in Tables 18 and 19. These prices are in current or 1975 dollars. The percentage change (plus or minus) in electricity prices in 1975 dollars was calculated using the historical and projected prices provided by the DOE. The percentage change in electricity price for a region was applied to the sample price data used to estimate the electricity demand equation via a computer program designed to predict electricity sales by city. In this manner, DOE electricity price change projections were applied to our electricity price data in order to utilize our estimated demand equation to predict future electricity sales. The projected 1985/1975 price ratios for residential electricity by DOE region are shown in Table 20.

Projection of Natural Gas Price

DOE historical and projected natural gas prices were used in the same manner as described above for the electricity price projections. The projected 1985/1975 price ratios for residential natural gas are shown in Table 20.

The technique used by the Department of Energy to project household electricity and natural gas prices is briefly described in Energy Supply and Demand in the Midterm: 1985, 1990, and 1995, prepared by the Office of Integrative Analysis, Midterm Analysis Division, April 1979. A mathematical computer model is used to make the midterm price projections. The computer model, Midterm Energy Forecasting System (MEFS), simulates the interactions of energy suppliers and consumers in the market place. Production and consumption responses to energy prices and explicit representation of the conversion of energy materials from one form to another for final consumption are contained in the model. The MEFS models price responses of producers, converters and consumers and projects price and quantity for each fuel at important points from extraction to final consumption.^{27/} The medium scenario, "C", as described in Table 18, was selected for our use in projecting residential electricity and natural gas prices by DOE region. Important assumptions underlying all of the DOE scenarios are described on

^{27/} Data used here are from special computer printouts provided by Terry Morlan, Director of the Demand Analysis Division, Office of Energy Use Analysis.

Table 16--List of States by DOE region*

New England

Connecticut
 Maine
 Massachusetts
 New Hampshire
 Rhode Island
 Vermont**

New York-New Jersey

New Jersey
 New York

Mid-Atlantic

Delaware
 Maryland
 Pennsylvania
 Virginia
 Washington, D.C.
 West Virginia

South Atlantic

Alabama
 Florida
 Georgia
 Kentucky
 Mississippi
 North Carolina
 South Carolina
 Tennessee

Midwest

Illinois
 Indiana
 Michigan
 Minnesota
 Ohio
 Wisconsin

Southwest

Arkansas**
 Louisiana
 New Mexico
 Oklahoma
 Texas

Central

Iowa
 Kansas
 Nebraska
 Missouri

North Central

Colorado
 Montana
 North Dakota
 South Dakota
 Utah
 Wyoming**

West

California
 Nevada**
 Arizona

Northwest

Washington
 Oregon
 Idaho

*Also includes Washington, D.C. Alaska and Hawaii are not shown.

**State not included in sample.

Table 17--List of sample cities by DOE region*

<u>New England</u>	Lexington*	Houston
Bridgeport	Louisville*	Galveston
Waterbury	Owensboro*	Dallas*
Hartford	Jackson*	San Antonio
Portland	Charlotte*	El Paso*
Boston	Raleigh*	Lubbock
Fall River*	Fayetteville	
Pittsfield	Greenville*	<u>Central</u>
Springfield	Columbia*	Des Moines*
Nashua*	Knoxville*	Sioux City*
Manchester*	Memphis*	Topeka*
Providence*	Nashville*	Lincoln*
		Omaha*
<u>New York-New Jersey</u>	<u>Midwest</u>	Kansas City*
Atlantic City*	Peoria*	St. Louis*
Newark*	Decatur*	Columbia*
New York*	Chicago*	
Rochester*	Muncie*	<u>North Central</u>
Binghamton*	Indianapolis*	Billings*
Buffalo*	Lafayette*	Colorado Springs*
	Fort Wayne*	Denver*
<u>Mid-Atlantic</u>	Evansville*	Great Falls*
Wilmington*	Flint*	Fargo*
Baltimore*	Duluth*	Sioux Falls*
Pittsburgh*	Minneapolis*	Salt Lake City
Philadelphia*	Rochester*	
Scranton*	Cincinnati*	<u>West</u>
Harrisburg*	Dayton*	Anaheim*
Erie*	Cleveland*	San Francisco
Richmond*	Columbus*	San Diego
Roanoke*	Milwaukee*	Los Angeles*
Norfolk*	Appleton*	San Jose
Arlington	Green Bay*	Phoenix*
Washington*	Racine*	Tucson*
Charleston*		
	<u>Southwest</u>	<u>Northwest</u>
<u>South Atlantic</u>	Lafayette	Seattle*
Birmingham*	Lake Charles	Portland*
Fort Lauderdale	New Orleans	Boise*
Atlanta*	Albuquerque*	
	Oklahoma City*	
	Fort Worth*	

*Cities marked with an asterisk make up the set for which 1985 residential electricity sales are predicted.

Table 18--Key assumptions by scenario

	A	B	C	D	E
I. Demand Curve Assumptions	High	High	Medium	Low	Low
Macroeconomic Forecast	High-trend	High-trend	Trend-long	Low-trend	Low-trend
II. Supply Curve Assumptions	High	Low	Medium	High	Low
Undiscovered Oil & Gas Resources	High	Low	Medium	High	Low
New Technology Potential Penetration	Medium	High	Medium	Low	Medium
Nuclear Power Maximum Additions to Capacity	High	Low	Medium	High	Low
III. Cost Assumptions	Low	High	Medium	Low	High
Enhanced Oil Recovery Costs	Low	High	Medium	Low	High
PACTEX Pipeline Tariff	Low	High	Medium	Low	High
Railroad Tariffs	Low	High	Medium	Low	High
Capital Cost for New Utility Plants	Low	High	Medium	Low	High

Source: Department of Energy computer printout.

Table 19--Assumptions underlying all of the scenarios^{1/}

-
1. Crude oil prices are decontrolled by 1981.
 2. The alternative fuel cost for limiting the surcharge added to natural gas prices for low priority users is set at the wholesale price of distillate fuel oil.
 3. There is a 130 percent lifecycle cost test for new, large oil or gas boilers.
 4. Natural gas prices to producers are limited as specified by the Natural Gas Policy Act of 1978.
 5. Limited amounts of Canadian and Mexican natural gas and liquefied natural gas can be imported.
 6. The price of natural gas imports under new contracts is tied to the world oil price.
 7. The Alaskan Natural Gas Pipeline is completed by 1985.
 8. The Trans-Alaskan Pipeline can be expanded to a capacity of 1.6 million barrels of oil a day by 1985 and to 2.2 million barrels a day by 1990.
 9. The PACTEX oil pipeline is the only oil pipeline link connecting the West Coast to the midwestern and southwestern pipeline networks.
 10. No domestically produced crude oil can be exported.
 11. Petroleum product imports are constrained to encourage the domestic refining of oil.
 12. The only new, coal-fueled electric powerplants that will be available in 1985 are currently in the planning stage.
 13. The rate reform provisions of the National Energy Act do result in the use of time-of-day rates that improve electric utilities' efficiency of operation.
 14. Nuclear powerplant construction is constrained by noneconomic factors.
 15. Diesel cars achieve a 9.4 percent share of the market by 1985 and this share remains constant thereafter.
 16. Diesel light-duty trucks achieve a 7.8 percent share of the market by 1985 and this share remains constant thereafter.
-

^{1/} One further assumption concerning the regional energy price forecasts from the DOE should be noted. The DOE forecasts are aggregated from regional projections. Conversation with the DOE researchers indicated, however, that a national price index was used to maintain constant dollar prices in the forecasts. Thus, the regional price projections do not account for regional variation in rates of inflation when adjusting forecasted prices to constant dollars. The implicit assumption is that there is no differential in the rate of inflation among regions between 1975 and 1985. The alternative would be to predict the rates of inflation by region which is beyond the scope of this study.

Table 20--Projected growth rates of electricity and natural gas price
for residential use, by DOE region, 1975 to 1985*

DOE region	Ratio of 1985 electricity price to 1975 electricity price	Ratio of 1985 natural gas price to 1975 natural gas price
New England	0.9195	1.2797
New York-New Jersey	0.8935	1.4117
Mid-Atlantic	1.0394	1.6285
South Atlantic	1.1218	1.8346
Midwest	1.1064	1.7541
Southwest	1.4329	2.0275
Central	1.1164	1.9535
North Central	1.1921	2.3276
West	1.1533	2.1325
Northwest	1.0891	1.7693

*Constant dollars

pages 9-11 of the DOE report and are summarized in table 18. A more detailed description of the DOE's assumptions are shown in the appendix of the DOE report.

Income Per Family

Specification of the electricity demand equation required family income since that measure is more appropriate as an indicator of ability to pay by electricity customers. The consuming unit is more accurately measured as the family than as the individual. The Regional Economics Information System of the Bureau of Economic Analysis provided computer printouts of historical personal income per capita for 1975 and projected personal income per capita for 1985. The 1975 income figure was in current or 1975 dollars and the 1985 income data was in 1967 dollars. The Personal Consumption Deflator is used by the Bureau of Economic Analysis to adjust personal income to constant dollars. Therefore, adjustment of the 1985 data to 1975 dollars required multiplication of all 1985 income data by 1.5295. The calculation of the required adjustment to put all income data in 1975 dollars was accomplished by using the Personal Consumption Deflator for 1967 and 1975 from the Survey of Current Business. A further adjustment was required because the base year for the Personal Consumption Deflator was changed from 1958 to 1972 in January of 1976. The change of base required an adjustment of 1.382 times the indicated ratio of the deflator for 1975 divided by the deflator for 1967. The total adjustment was

$$\frac{1.265}{1.143} (1.382) = 1.5295.$$

In addition to the adjustment to constant dollars, the income data were weighted to reflect the populations of the service areas of the electric utility districts for which the demand forecasts were required. The old BEA economic area codes were used in conjunction with computer printouts provided by the Bureau of Economic Analysis showing population by economic area. For example, the demand Standard Metropolitan Area denoted by our study as "Birmingham" consists of BEA Economic Areas 40, 45, and 137 (Montgomery, Birmingham, and Mobile, Alabama). The relative share of population was used to compute a weighted average income for the utility service area denoted as Birmingham. Historical population data from the BEA were used to weight the BEA historical per capita income data and BEA 1985 projected populations were used to weight the 1985 BEA projected per capita incomes. As noted earlier, the correct measure to indicate ability to pay for household electricity is assumed to be family income. BEA forecasts of family income were not available so the percentage growth of per capita income from 1975 to 1985 was calculated from historical and projected per capita incomes provided by the Bureau of Economic Analysis. A computer program, designed to predict household electricity sales by city, applied the projected rate of change of per capita incomes to the family income sample data used in the estimated residential electricity demand equation. In this way, BEA data were applied to our family income data in conjunction with our estimated demand equation to predict future electricity sales.

Heating Degree Days.

The long run average heating degree days was used as the predictor of heating degree days in 1985. In the absence of any recognized systematic predictor relation for heating degree days, the expected value serves as the maximum likelihood estimator. It is, of course, possible that existing or new theories of climatic change could allow meteorological experts to devise forecasts which could be incorporated into our electricity sales prediction model in place of the average heating degree days measure.

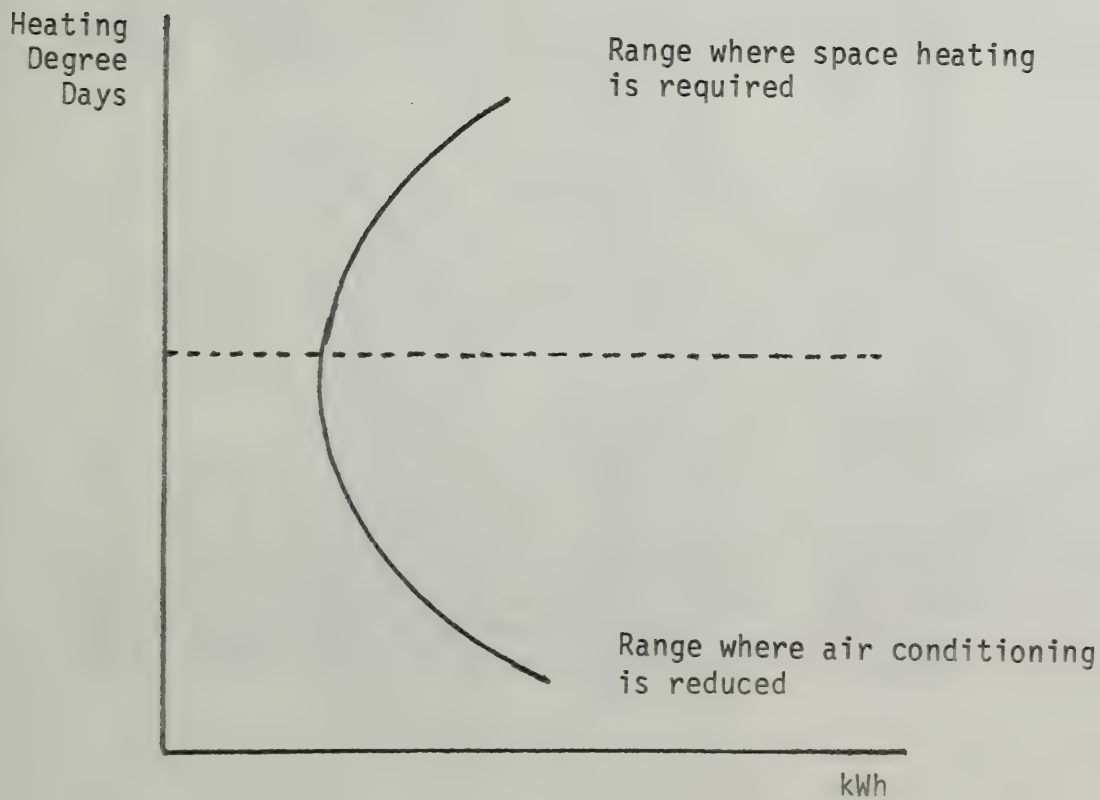
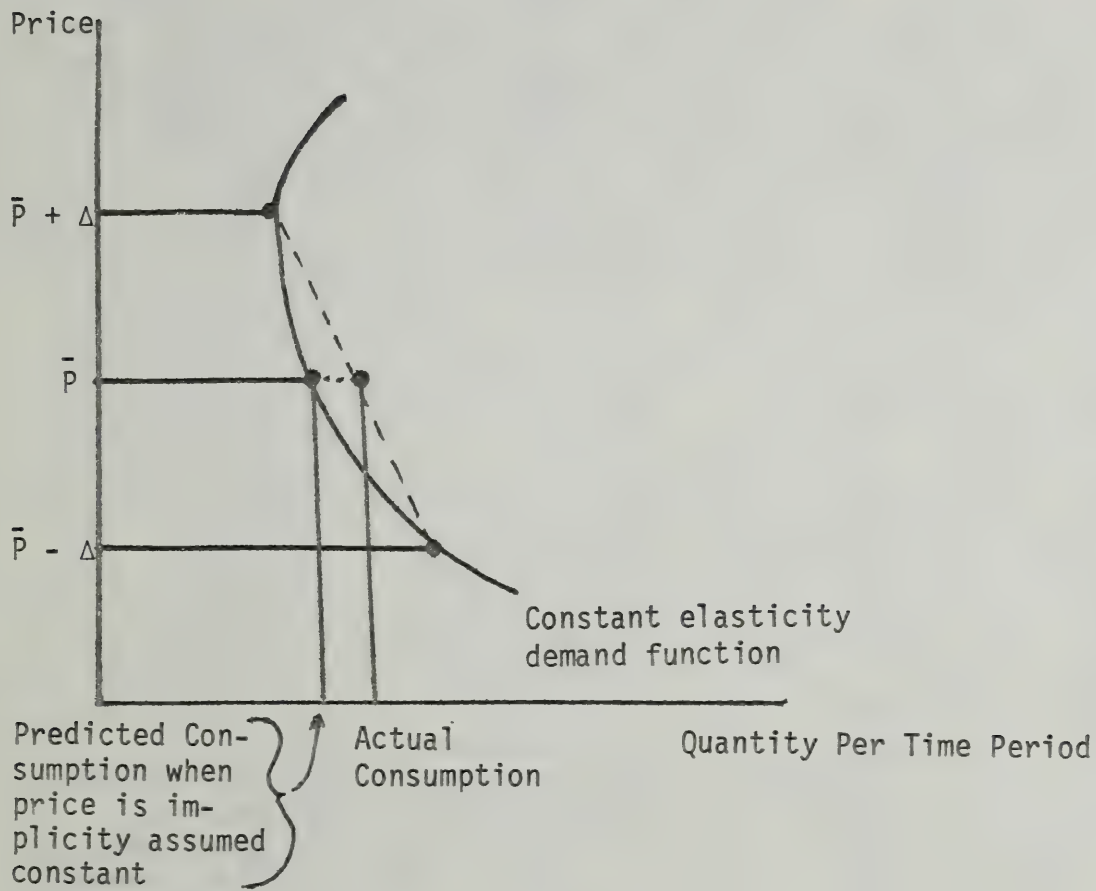
Bias

As discussed in the previous section, single point estimates are substituted for the various independent variables (for a given city) in the statistical demand equation. As is well known, the Jensen Inequality implies that greater accuracy can be obtained when the prediction equation is nonlinear if the distribution of values which will exist over the prediction period is incorporated into the forecasting process. Our demand equation is a double logarithmic transformation and also contains quadratic terms for heating degree days. The use of single point projections of the independent variables, such as expected price in 1985 or average heating degree days, may lead to some bias in the forecast. For example, consider the log-linear demand function depicted in Figure 6. Suppose that price in year 1985 takes the value $\bar{P} + \Delta$ exactly half the time and the value $\bar{P} - \Delta$ the rest of the time. \bar{P} is the expected price based upon DOE projections. As is shown in Figure 6, when the estimated demand equation is convex, the use of the single point projection of price tends to understate the quantity demanded in comparison with the prediction which is obtained if the prediction is based upon a weighted average of the amounts consumed at the two prices which actually exist in 1985. Of course, the latter prediction requires knowledge of the probability distribution of price in 1985 which is more difficult to estimate than the single expected value. Given the difficulty and complexity of arriving at a point price forecast, determination of the probability distribution of prices is impractical. Nonetheless, it is important to note the direction of the bias inherent in the prediction technique. A *downward bias* of unknown magnitude will exist in the forecast of electricity consumption because of the lack of information on the expected variability of 1985 electricity prices. A similar effect occurs for other variables which appear as arguments in the demand equation. It should be noted that it is the variability of the independent variables over the course of the year 1985 *within* a given city, not across cities, that is relevant. In some instances, data to allow an estimate of this variability might be obtained. One example of this is in the heating degree days variable. The average variability of heating degree days for a given city for a year might be used to project the variability for 1985. The heating degree days relationship to quantity demanded is also convex as shown in Figure 6 and this again leads to an understatement of quantity demanded if the probability distribution of HDD is neglected.

Future Electricity Consumption City by City

The following tables present predictions of per family and total household electricity consumption by city in 1985. In addition to the base consumption

Figure 6--The log-linear demand function



projections the change in consumption from 1975 to 1985 is partitioned out for each of the causal variables. Thus, the separate influences of changes in a particular city's energy price structure and income level on electricity consumption are indicated. The effects of changes in prices and incomes depend both on the elasticity estimated by the regression model and on the amount of price and income changes projected by DOE and BEA for 1985. The effects of an error in the price or income forecasts are easily measured by observing the constant elasticities estimated by the regression model. Examination of the estimated coefficients in Model VI reveals that, for each 1 percent increase in the projected electricity price, the per family consumption of electricity will decline by 0.72 percent. Likewise, for each 1 percent increase in income, per family consumption will rise by 0.35 percent. The cross elasticity effect of changes in natural gas price on electricity consumption shows that, for each 1 percent rise in gas prices, electricity consumption will decline by 0.10 percent. A 1 percent increase in humidity will cause electricity consumption to rise by 0.44 percent. The effects of changes in the heating degree days projections on the electricity consumption forecasts are not easily seen from the regression equations. The quadratic equation used to model the effects of HDD on electricity consumption does not lend itself to easy interpretation via elasticities. For this reason, the computerized prediction program will provide estimates of the effects on per family electricity consumption for increments of 10 and 50 percent to Heating Degree Days for each city electricity consumption forecast. Although the constant elasticity coefficients provide easy interpolation of the effects of changes in prices and incomes, a given percentage error in the DOE price forecasts results in differing amounts of adjustment depending on the magnitude of the original forecasted change for the particular DOE region. It is useful, therefore, to present a sensitivity analysis which shows the resulting consumption prediction if *all* DOE price projections are assumed to be understated by 10 percent. Likewise, the effects of an understatement of the BEA income projections by 10 percent is shown. It should also be noted, that total consumption is based upon the BEA projections of population by city. The forecast sensitivity to population forecast errors is proportional and need not be simulated on the computer, i.e., a 10 percent understatement of projected population simply understates consumption by 10 percent. This possible source of error should not be ignored, however.

Two sample tables, typical of the computer-generated output for 136 utility service areas in the United States, are shown. The complete set of 136 tables is contained in Appendix III. In addition to the salient features of the tables discussed above the heating degree days variable requires further comment. As shown in Figure 7, the amount of electricity consumed declines as cooler weather (higher HDD) is encountered. This is because less air conditioning is required. When extremely cold weather occurs, the relationship reverses and more electricity is consumed. Electric space heating and increased water heating requirements offset the savings in air conditioning energy use. Typically, kWh declines from level A to level B in Figure 7 when HDD increases by 10 percent. When HDD is increased by 50 percent a decline in kWh from A to C typically occurs. For a few cities, where HDD is above average (cold climate), a 50 percent increase in HDD actually results in increased kWh. This is depicted by a movement from A to D in Figure 7. The second sample table for observation 53 is an example of the latter situation while the sample table for observation 1 is an example of the

UPSEFVATION NUMBER IS: I

UTILITY NAME: ALABAMA POWER CO.

CITY NAME: BIRMINGHAM

(FEA REGION 4)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	38.17	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	42.82	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	2.26	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	4.15	\$/MILLION BTU
1975 FAMILY INCOME	10644.75	\$/YEAR	PROJECTED 1985 FAMILY INCOME	14204.41	\$/YEAR
1975 HEATING DEGREE DAYS	1437		PROJECTED (AVERAGE) 1985 HEATING DEGREE DAYS	1580	
1975 NUMBER OF CUSTOMERS	777974		PROJECTED 1985 NUMBER OF CUSTOMERS	817600	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-0.823	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	1.094	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	0.668	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-0.233	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	10.455	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	11.061	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0580	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	8133595.673	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	9043641.996	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.1119	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:	
WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-598179.961 THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	302316.296 THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	88347.763 THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-215038.514 THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-955973.681 THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 53

UTILITY NAME: MINNESOTA POWER AND LIGHT CO.

CITY NAME: DULUTH

(FEA REGION 5)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	43.96	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	48.64	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.422	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	3.79	\$/MILLION BTU
1975 FAMILY INCOME	5575	\$/YEAR	PROJECTED 1985 FAMILY INCOME	14912.25	\$/YEAR
1975 HEATING DEGREE DAYS	81406	DAYS	EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	5419	DAYS
1975 NUMBER OF CUSTOMERS			PROJECTED 1985 NUMBER OF CUSTOMERS	90700	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-.440	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	.826	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.370	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	.020	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	6.276	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	7.017	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.1180	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	510944.566	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	636432.736	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.2456	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-42096.017	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	21275.055	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	6217.341	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-4597.907	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	42713.497	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

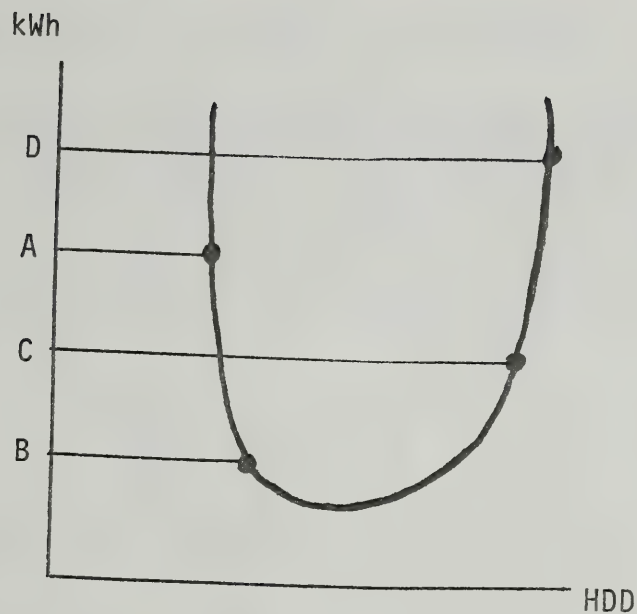


Figure 7--Heating degree days variable relationship

former. Cities with cold climates, where a 50 percent increase in HDD results in increased KWh, include Duluth, Minneapolis, Fargo, Sioux Falls, Great Falls, Manchester, Nashua, Rochester, Milwaukee, Racine, Appleton, and Green Bay.

CHAPTER VI. THE NEED FOR FURTHER RESEARCH

The primary goal of the research presented here was to project household electricity demand in 1985 in specific utility service areas. However, the process of model building and empirical testing serves the dual purpose of explaining and predicting through the development of cause and effect relationships. The broader contribution to theoretical and empirical analysis is to increase knowledge concerning the operation and behavior of markets, institutions and consumers. A more accurate perception of these elements allows decision units to promulgate policies which are appropriate to real world problems. The development of more complex models to describe the operation of markets for electricity may or may not allow more accurate prediction of sales in 1985. It is more likely that the extension to more realistic models would enable decisionmakers to better predict the ramifications of public policy actions which may impact the functioning of markets and consumer decisions. For example, more detail on the reaction time to price changes or other exogenous influences can be supplied through a model which describes both the time path of change in appliance utilization rates and the investment or disinvestment process in electric appliances.^{28/} For prediction purposes, we have utilized a simplified model which combines changes in appliance stocks and changes in utilization rates into the price effect. For policy analysis, available data can be utilized to study more precisely how consumers react to changing prices and other variables.⁽¹⁾

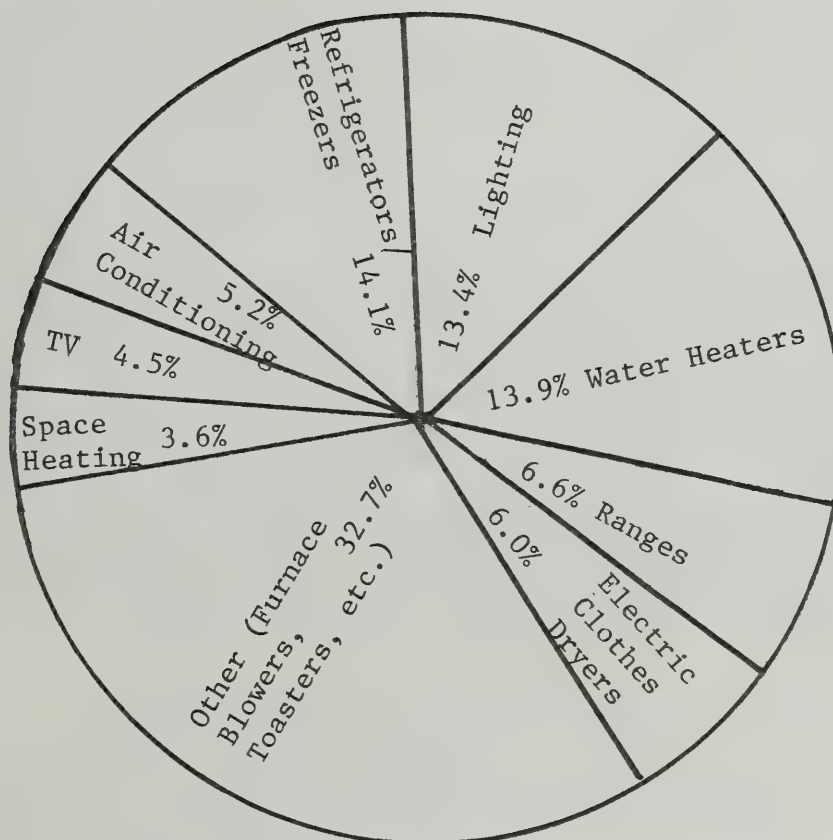
Our research has concentrated on collecting and developing an improved data set with which to study residential electricity consumption. We have replicated previously developed demand models for our service areas and have developed improved models. A data set based on observations across Standard Metropolitan Areas has been assembled. Part of this data set is derived from information, provided by the American Gas Association, measuring prices of substitute fuels such as natural gas, propane, heating oil and wood. Most other studies have relied upon crude estimates to approximate these substitute fuel price effects.^{29/} The AGA data provide us with superior, previously unused observations for residential electricity demand analysis.

Previous studies have often failed to adjust for differences in the cost-of-living between regions. They have also used cross-state observations in their statistical analyses. Unfortunately, cost-of-living estimates are unavailable on a cross-state basis. Using the SMA observational unit and the AGA price data allowed us to develop cross-city cost-of-living data. Each of the models we test can be estimated both with nominal price and income variables and with monetary variables adjusted for cost-of-living differences between SMA's. This is extremely important in the EPA-USDA research because of its emphasis on small area interregional competition. The level of detail on the demand side must match the level on the supply side.

^{28/} According to a study by the Center for Policy Alternatives at the Massachusetts Institute of Technology the electrical consumption for residences was broken down into the categories shown in Figure 8.

^{29/} Previous electricity demand studies suffer from numerous defects, many of which are related to the paucity of accurate data.

Figure 8--Distribution of residential electricity consumption, 1974



Existing studies of residential electricity demand are extremely heterogeneous in the structuring of their models and in their research findings. All studies agree that prices are important in projecting the future sales of electricity. Due to differing methodologies employed by researchers, reflecting differing assumptions concerning the appropriate way to describe the behavior of purchasers and sellers of electricity, quite different estimates of the effects of price changes on quantity sold have been reported. In the process of replicating some of the existing studies using our improved data set new insights suggest certain modifications in the structuring of model specifications. Also, combining the ideas of previous researchers has resulted in new models to be investigated. Preliminary work with some of these models has commenced but much of the investigative work on the new models cannot be included in this report.

We have determined that long run electricity demand projections should consider changes in shares of appliances powered by electricity. However, our test of this hypothesis^{30/} depends on a single year (1960) of substitute fuel price data (provided by the AGA). A complete and accurate statistical analysis of the lagged and cumulative effects of historical fuel prices on current and future electric appliance stocks depends on the AGA data.

Further research support would enable us to (1) continue the development of our data set, (2) more fully utilize the superior AGA substitute fuel price information, (3) continue the development and testing of several alternative models of the market for residential electricity, and (4) estimate the coal-fired electricity demand of those utilities not represented by SMA data. Continued research would permit the development of a residential electricity demand model which is more realistic and sophisticated than those now in existence. This model promises to provide a more complete understanding of the structure of residential electricity demand. It will permit forecasts which incorporate far more of the variable factors influencing future electricity sales. The understanding of these factors and their relation to household electricity consumption should provide useful information for policy analysis.

Our research, to this point, suggests further examination of a two-tier model. The first equation relates quantity of electricity demanded per customer to the price of electricity, weather conditions, and the level of saturation of ownership of residential electrical appliance stocks. A second equation relates the saturation levels of ownership for each residential electrical appliance to the price of electricity, the prices of competing fuels,^{31/} income, climate, and other regional characteristics.

Equations to predict appliance saturation rates for five appliances have been estimated. In general, these five equations relate the percentage of households with an electrical appliance (automatic washer, air conditioning, dishwasher, food freezer, and electric water heater) to the saturation level of these appliance stocks ten years earlier, to prices for electricity and to

^{30/} See Appendix II.

^{31/} Historical fuel prices should and will be incorporated here using the AGA price data set. Currently a version of the "short cut" distributed lag model is used to account for the missing historical fuel price data.

the prices of competing fuels. (Climatic conditions for the region are relevant for some appliances.) Thus far, only simple linear functions have been estimated for the appliance saturation prediction equations. More sophisticated equations can be developed with the yearly data on fuel prices provided by the American Gas Association.

Exploratory Modeling

1. Development and testing of a two-tier (recursive) model to forecast residential electricity demand in urban areas is described above. This model is complete except for historical fuel price data. Experimentation with 1960 AGA fuel price data has shown that saturation levels of residential electrical appliances are partially determined by historic fuel price levels. The AGA has supplied yearly observations, by city, as required to complete the development of the appliance saturation prediction equations. These data have not been previously released for use in statistical modeling and no previous electrical demand models have utilized historical price data to predict electric appliance saturation levels.

2. Development of a data set across cities (SMA's) and consisting of 177 variables with over 300 more variables added by transformations. An additional set of variables can be calculated from DOE data to permit the testing of a simultaneous equation (supply and demand) model to predict residential electricity use. Our data set include price deflators for cities which will allow the testing of all models with and without price deflation. Previous studies have not usually deflated across regions^{32/} although they have deflated over time. This data set will allow an analysis of the effects of interregional price differentials. The data set also includes electric bill data provided by the Department of Energy by city. These data will allow the testing of hypotheses which argue either for marginal pricing or average pricing and/or combinations of fixed charges plus marginal prices. As mentioned above, a controversy exists over the proper specification of consumer behavior in this regard.

Summary of Work in Progress and/or Proposed

1. The two-tier residential demand model has been validated but the electrical appliance saturation can be much more accurately specified using the historical AGA fuel price data.^{33/}

2. Development of a two equation simultaneous model of supply and demand is in progress. Currently, data are being collected which will be used in the supply portion of the two equation model. This model will include electric appliance saturation rates predicted by the AGA fuel price data. This model structure will be a simultaneous supply and demand model with a recursive component to show how appliance stocks are affected by historic fuel prices and how appliance stocks affect current electricity demand. Several effects not previously tested in supply functions will be tested in the simultaneous model. Supply variables could include an average weighted fuel input price,

^{32/} In fact, only cross-city deflators exist and these may be inappropriate for the cross-state data generally used in prior studies.

^{33/} See Appendix II.

the weighted average age of boilers, a combination of variables which will adjust for the plant size mix for any given utility^{34/} and, of course, the output produced.

3. The development and testing of an alternative demand equation similar to one specified by consultants for EPRI (95). This demand equation incorporates appliance stocks weighted by their average utilization rates for the total U.S. A utilization prediction equation attempts to forecast how regional variations in fuel prices, weather, and other regional characteristics affect the rate of use of the appliance stocks. Our model differs from the EPRI model in that we use city data and the EPRI model related utilization to the absolute capacity of appliances, if used 24 hours per day, rather than explaining deviations from normal use.

4. Development and testing of commercial and industrial electricity demand prediction equations. Model development by researchers in these markets is rudimentary and the disaggregation incorporated by previously published models is at the state level. The data set which has been collected includes price and quantity data for commercial and industrial demand by SMA. We have recently added data to show commercial business activity and industrial production by SMA. Thus the data set for this portion of the electricity demand analysis is nearly complete. Sorting and merging of data sets is all that remains before the statistical estimation analysis can proceed.

5. The two-tier residential electricity demand model can be replicated for years other than 1975, the base year for our current model. This will allow testing of the hypothesis that consumer behavior is changing over time as awareness of energy shortages and government policies affect consumer tastes.

^{34/} See Appendix I

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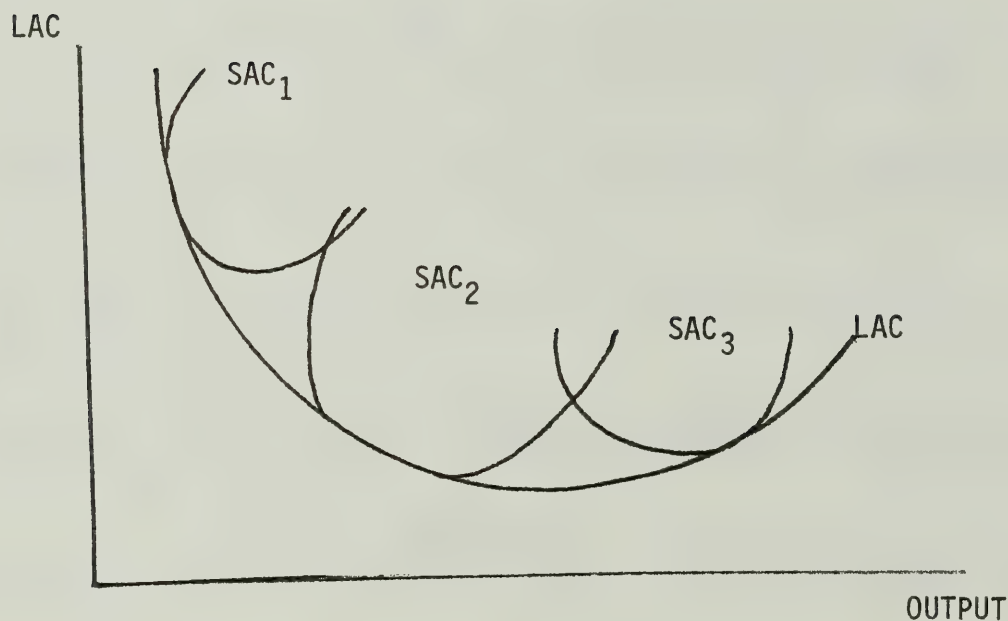
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APPENDICES

APPENDIX I

A TECHNIQUE TO ADJUST FOR PLANT SIZE MIX WHEN ESTIMATING
LONG RUN COST FUNCTIONS

If we assume that physical generating capacity is roughly equivalent to the short run average cost concept, as shown above, then the mix of plant sizes owned and operated by an electric utility company affects their overall efficiency. Other factors which affect cost and efficiency are ignored in this discussion.

Given that scale affects efficiency, we can write

$$SAC = f(c) \quad (1)$$

where AC is the average cost per unit of electricity produced for a given mix of plant sizes. The mix of plant sizes can be demarcated as a probability distribution $P_r(c)$. The expected LAC is the sum of all possible (existing) SAC's weighted by the relative frequencies of occurrences of their output capacities, i.e.,

$$E(LAC) = \int (SAC) (P_r(c)) dc \quad (2)$$

or, by substituting in equation (1), we find

$$E(LAC) = \int f(c) P_r(c) dc. \quad (3)$$

We can express the expected value or average of the LAC's associated with a given mix of plant sizes in terms of the moments of the frequency distribution of plant sizes (capacities). To accomplish this, substitute a Taylor's expansion for $f(c)$, letting $c = \bar{c} + c'$ where c' is any deviation from the mean plant size \bar{c} . The Taylor's expansion about the point \bar{c} is

$$f(c) = f(\bar{c}) + f'(\bar{c})(c - \bar{c}) + \frac{1}{2}f''(\bar{c})(c - \bar{c})^2 + \frac{1}{6}f'''(\bar{c})(c - \bar{c})^3 + \dots \quad (4)$$

Expected LAC is found by substituting equations (3) and (4).

$$E(LAC) = \int f(\bar{c}) P_r(c) dc + \int f'(\bar{c})(c - \bar{c}) P_r(c) dc + \frac{1}{2} \int f''(\bar{c})(c - \bar{c})^2 P_r(c) dc + \frac{1}{6} \int f'''(\bar{c})(c - \bar{c})^3 P_r(c) dc + \dots \quad (5)$$

The second term of equation (5) is always zero. The first term reduces to $f(\bar{c})$, the third term becomes $\frac{1}{2} f''(\bar{c}) v_c^2$ and so forth. The generalized expression for expected LAC can be written:

$$E(LAC) = f(\bar{c}) + \frac{1}{2} f''(\bar{c}) v_c^2 + \frac{1}{6} f'''(\bar{c}) S_c + \frac{1}{24} f^{(4)}(\bar{c}) K_c + \dots \quad (6)$$

where \bar{c} is the average capacity, v_c^2 is the variance of plant capacities, S_c is the skew and K_c is the kurtosis of the plant capacity distribution for a utility.

A simple way to estimate equation (6) is to regress LAC on the RHS of equation (6); this results in $E(LAC | f(c))$. Addition of \bar{c} , v_c^2 , S_c and K_c to a long run cost function should more completely and accurately specify the elements affecting costs. If the plant size distribution is normal, then only \bar{c} and v_c^2 are required to completely describe the distribution. Also, if the LAC is linear, then only \bar{c} need be included since f' and higher

derivatives in (6) will all be zero. Likewise a quadratic LAC would only require that c and v_c^2 be included in the cost curve equation. It seems likely that at least one of the above conditions would hold, reducing the necessary scale variables to c and v_c^2 . Whether or not higher order moments of the plant size distribution need be included can be determined empirically.

APPENDIX II

EXPLORATORY ANALYSIS OF THE TWO-TIERED APPLIANCE STOCK MODEL
WITHOUT COMPLETE HISTORICAL PRICE DATA

In order to capture both the effect of electricity price on the saturation levels of electric appliances and to incorporate utilization effects of electricity price changes, we adopted the recursive model discussed below.^{1/}

Our reasoning leads us to believe that the market is most accurately depicted by a two-tiered model. The first equation explains the rate of utilization of appliances. It relates the quantity of electricity demanded per capita to the price of electricity, weather conditions, and the level of ownership saturation. The level of ownership saturation is related to the price of electricity, the historical prices of competing fuels, income, climate, and other regional characteristics.

Specifically, the first equation relates per capita electricity consumption to the percent of houses with electric hot water, electric clothes dryer, electric space heat, air conditioning, electric range, automatic washing machine or electric food freezer. In addition to the saturation levels of these appliances, the model includes current prices and income, several measures of weather and state dummy variables which allow for shifts in demand or for variation in demand elasticity across regions. Several different models have been developed, and these are presented in Tables E-1 through E-8 near the end of this appendix.

The second equation set estimates the saturation levels of these electrical appliances. This must precede the projections of the long run demand for electricity. Equations to predict appliance saturation rates for eight appliances have been estimated. In general, these eight equations relate the percentage of households with an electrical appliance (automatic washer, air conditioning, food freezer, electric hot water, etc.) to the saturation level of these appliance stocks ten years earlier,^{2/} to prices for electricity and to prices of competing fuels. (Climatic conditions for the region are relevant for some appliances.) Thus far, only simple linear functions have been estimated for the appliance saturation prediction equations. (More sophisticated equations can be developed with annual data on fuel prices supplied by the American Gas Association.) These equations are presented in Tables S-1 to S-8 at the end of this appendix.

Development and initial testing of a two-tiered (recursive) model to forecast residential electricity demand in urban areas is complete except for

^{1/} Cross section regression is often suggested to measure long run equilibrium relationships. If appliance stocks are excluded from the demand specification, and if current electricity prices act as a proxy for historical or expected prices, then the estimated price elasticity is an approximate measure of the long run sensitivity of sales to price. This kind of estimate provides little understanding about the mechanisms by which consumer behavior is manifest in the market place.

^{2/} A version of the "short cut" distributed lag to substitute for missing historical fuel price data.

missing historical fuel price data. Experimentation with 1960 AGA fuel price data has shown that saturation levels of residential electrical appliances are partially determined by prior fuel prices. The AGA has supplied yearly observations, by city, as required to complete the development of the appliance saturation prediction equations.

The following two sets of tables show preliminary equation estimates which can be revised to incorporate the AGA fuel price data for 1960-1975. The first set of tables, Tables E-1 through E-8, show some alternative approaches to the formulation of the short run electricity demand, the demand for electricity when stocks of electrical appliances are fixed. These short run models all predict the kWh/household for the year 1975. Most of the models contain dummy shift variables for each state. Previous research has noted a wide variation in price elasticity by region, in some cases our state dummy variables adjust the elasticity while in others they shift the entire demand function. The final model can be estimated both ways to obtain the best fit.

Model E-1

Model E-1 is a common log linear model in which all variables, except the dummy variables, are transformed into logarithms. The estimated B coefficients can be interpreted directly as elasticities. Price elasticity is $-.747$ and income elasticity is $+.835$; the cross elasticity with fuel oil is $-.168$. The fuel oil price appears to have the wrong sign since it is not normally considered to be a complement to electricity. This equation is one of the few regression models to contain income as a significant determinant of quantity demanded.

Model E-2

Model E-2 is linear which may reduce the fit and the number of variables which entered. A new variable is introduced, LWA, which is a weighted average of the percentage of houses having each type of electrical appliance. The weights used to aggregate the appliance saturation levels are the national average rates of use for the respective appliances.

Model E-3

Note that both Model E-1 and E-2 use deflated monetary variables. Model E-3 uses nominal or undeflated money variables and this reduces the accuracy of the model. Model E-3 is expressed in logarithms so that the B coefficients can be interpreted directly as elasticities. The state dummy variables are multiplied by electricity price so that the estimated coefficients of the dummies are adjustments to the price elasticity for particular states. Note that, in place of the weighted average appliance saturation level, the saturation percentages for automatic washers and for electric heat are entered individually. The saturation rate for electric heat also enters as an interaction term with electricity price. It indicates that price elasticity is lower in regions where electric heat is more prevalent. Price elasticity in this short run model is $-.597$.

Model E-4

Table E-4 shows the correlations among the various measures of electric appliance saturation rates. As a preliminary trial, it was decided to aggregate all appliances except air conditioning. Air conditioning has a low correlation with most other appliance saturation rates. It is intuitively clear that the climatic variables in the models are related to air conditioning in different ways than to other appliances. Table E-4 shows very high correlations among some saturation variables. High correlations suggest aggregation since the separate influences of these variables cannot be statistically identified. Future research can investigate alternative schemes to aggregate the saturation measures.

Models E-5 and E-6

Model E-5 is an appliance utilization rate model. The variables in the model regulate the rate of use of WA, the weighted average of all appliance saturation rates. The variable LP, for example, is the coefficient of electricity price on the rate of use of all appliances. This model is disaggregated later into an air conditioning saturation rate versus all other appliances. This will be shown in Models E-7 and E-8.

Model E-6 is similar to E-5 except the state dummy variables do not indicate differences in the coefficients of the price variable. Instead, these dummies shift the entire equation to account for regional variations in electricity demand. Note that, in this case, the demand shift regional adjustment appears to fit slightly better. The R^2 rises slightly from .93 to .94 and the F values for the dummy variables are higher.

Models E-7 and E-8

Models E-7 and E-8 are similar to models E-5 and E-6 except that the rate of use of air conditioning is assumed to be affected differently by the price and weather variables than is the rate of use of other electric appliances. The variable (WB)(P), for example, shows the effect of changing electricity price on non-air conditioning appliance use while the coefficient of (WAC)(P) shows the effect of changes in electric prices on air conditioning use. Note that the electricity price effect on air conditioning appears to be much smaller. Model E-7 is for nominal money values while model E-8 is for deflated money values. The R^2 increases from .679 to .953 when the adjustment for cost-of-living is made. The effect of price on the rate of utilization of non-air conditioning appliances is lower with deflated data.

Models S-1 through S-9

Tables S-1 through S-9 show preliminary estimates of the long run determination of electric appliance saturation. In each case, the dependent variable to be predicted is the percentage of houses having a particular electric appliance.^{3/} Note that the prices of electricity and of substitute fuels enter in many of the equations. The fuel prices in 1960 are used as a surrogate for expected fuel prices; in some cases, the saturation rate of the

^{3/} Weighted aggregates of these electric appliance saturation rates appear as independent variables in some of the short run models. In combination, they form a recursive system.

appliance ten years previously is a significant determinant also. This is a form of distributed lag effect which indicates that the fuel price data for 1960 is not an adequate indicator of fuel price expectations. The detailed AGA fuel price data will allow us to construct Almon lag models to moreprecisely estimate expected fuel prices. These exploratory models simply show the appropriateness of the further development of these ideas. It is interesting to note that alternative fuel prices do not enter the short run models but, as would be expected, they do enter into the determination of the type of fuel to use in many of the appliances. Climatic variables, as opposed to the weather variables which entered the short run demand functions, are significant in several of the electric appliance saturation models. As previously discussed, these latter equations can be combined with the short run models to predict the total long run sensitivity of electricity sales to changes in price and income.

TABLE E-1

DEPENDENT VARIABLE: Log transform of
kWh/Customer in 1975

SAMPLE SIZE: 40 SMSA's

INDEPENDENT VARIABLES:

S's are state shift dummy variables
P is deflated electricity price in 1975
OP is deflated fuel oil price in 1975
CDD is cooling degree days in 1975, a
weather variable
INC is deflated median income per capita
HDD is heating degree days, a weather
variable

FUNCTIONAL FORM:

LOG LINEAR MODEL - (Coefficients
can be interpreted directly as
elasticities except for the state
dummies)

Multiple R	.992
R Square	.985
Adjusted R Square	.966

-----VARIABLES IN THE EQUATION-----

VARIABLE	B	t-VALUE SIGNIFICANCE
S38	-.96801144-01	- 1.56
S37	.67929893	8.52
S56	.26769338	2.11
S42	-.72449080	- 2.43
S58	.37544829	3.67
S30	-.21719585	- 3.78
S45	.19340005	2.31
S27	-.37033114	- 4.10
S22	-.21710953	- 2.60
S31	-.21027925	- 2.64
S23	-.21468990	- 2.41
S47	.36847097	4.35
S60	-.41251729	- 6.70
S44	.91365971	6.75
S28	-.20590192	- 2.95
S34	-.13691083	- 2.77

TABLE E-1 (cont'd)

-----VARIABLES IN THE EQUATION-----		
VARIABLE	B	<u>t-VALUE</u> SIGNIFICANCE
S54	.38391326	3.86
Log P	-.74720132	-12.77
Log OP	-.16793127	- 3.60
CDD	.23025337	6.24
Log INC	.83480305	2.81
HDD	.25209084	6.43
(Constant)	-6.2864911	- 2.17

TABLE E-2

DEPENDENT VARIABLE: kWh/Customer in 1975SAMPLE SIZE: 40 SMSA'sINDEPENDENT VARIABLES:WA is the weighted average electric
appliance saturation rate

S's are state shift dummy variables

P is real (deflated) electricity price
in 1975CDD is cooling degree days in 1975, a
weather variableFUNCTIONAL FORM:

LINEAR MODEL

Multiple R 0.972

R Square 0.941

Adjusted R Square 0.926

-----VARIABLES IN THE EQUATION-----

VARIABLE	B	t-VALUE SIGNIFICANCE
WA	12.997	4.60
S37	11.462	11.17
S58	5.587	5.96
P	-0.976-01	- 5.97
S33	2.134	3.37
CDD	0.153-02	2.53
S54	3.717	2.87
S66	-1.087	- 1.92
(Constant)	8.462	9.20

TABLE E-3

DEPENDENT VARIABLE: Log transform of
kWh/Customer in 1975

SAMPLE SIZE: 95 SMSA's

INDEPENDENT VARIABLES:

% AUT, % EHF are actual appliance saturation rates for individual appliances (automatic washer and electric heating fuel)

P is nominal electricity price in 1975

EPEHF is an interaction between nominal electricity price in 1975 and percent houses with electric heating fuel

S's are state shift dummies times the log of 1975 electricity price. They can be interpreted directly as adjustments to price elasticity by state

FUNCTIONAL FORM:

LINEAR MODEL

Multiple R	0.904
R Square	0.818
Adjusted R Square	0.796

-----VARIABLES IN THE EQUATION-----

VARIABLE	B	<u>t-VALUE</u> SIGNIFICANCE
Log P	-0.597	- 8.21
CDD75	0.453-03	9.48
(HDD)(EH)	0.118-02	4.86
HUM 75	0.488-02	4.03
(S37)(Log P)	0.103	4.15
%AUT70	0.6714	2.81
MUNI75	-0.485-01	- 2.16
(S56)(Log P)	-0.630-01	- 2.09
%EHF70	-5.449	- 2.41
(Log P)(%EHF)	1.355	2.10
(Constant)	2.988	8.60

TABLE E-4

Correlation Matrix of Electric Appliance Ownership Saturation in 1970

	%EWHF	%ECF	%EHF	%ED	%AUT	%AC	%DW	%FF
%EWHF	1							
%ECF	0.848	1						
%EHF	0.713	0.570	1					
%ED	0.572	0.765	0.322	1				
%AUT	0.232	0.491	0.022	0.548	1			
%AC	-0.047	-0.314	-0.060	-0.352	-0.413	1		
%DW	-0.005	0.139	0.245	0.167	0.294	-0.107	1	
%FF	0.347	0.410	0.176	0.572	0.382	-0.165	0.014	1

%EWHF = percent houses with electric water heating fuel

%ECF = percent houses with electric cooking fuel

%EHF = percent houses with electric heating fuel

%ED = percent houses with electric dryer

%AUT = percent houses with automatic washer

%AC = percent houses with one or more air conditioners or central air conditioning

%DW = percent of houses with dishwasher

%FF = percent houses with food freezer

TABLE E-5

DEPENDENT VARIABLE: kWh/Customer in 1975SAMPLE SIZE: 40 SMSA'sINDEPENDENT VARIABLES:FUNCTIONAL FORM:

(HUM)(WA) is Humidity times WA (defined below)

LINEAR MODEL

(P)(WA) is real (deflated) electricity price
in 1970 times WA(CDD)(WA) is cooling degree days in 1975 times
WA(S)(P) are state shift dummy variables times
electricity priceWA is a weighted average of all electric appli-
ance saturation levels for each SMSA...the weights
used are the national utilization rates of each
appliance.

Multiple R	0.971
R Square	0.944
Adjusted R Square	0.929

-----VARIABLES IN THE EQUATION-----

VARIABLE	B	t-VALUE SIGNIFICANCE
(HUM) (WA)	0.312	7.81
(S) (537) (P)	0.294	11.65
(S) (538) (P)	0.157	5.43
(P) (WA)	-0.577	- 6.68
(S) (533) (P)	0.495-01	3.04
(CDD) (WA)	0.123-01	3.84
(S) (544) (P)	-0.102	- 2.67
(S) (531) (P)	-0.671-01	- 1.89
CONSTANT	6.143	11.02

TABLE E-6

DEPENDENT VARIABLE: kWh/Customer in 1975SAMPLE SIZE: 40 SMSA'sINDEPENDENT VARIABLES:

Same as previous table except S is a state
shift dummy, it is not multiplied times
the electricity price

FUNCTIONAL FORM:

LINEAR MODEL

Multiple R	0.976
R Square	0.953
Adjusted R Square	0.940

-----VARIABLES IN THE EQUATION-----

VARIABLE	B	t-VALUE SIGNIFICANCE
(HUM) (WA)	0.309	8.49
S37	11.743	12.82
S58	5.046	6.00
(P) (WA)	- 0.544	- 6.80
S33	2.364	4.29
(CDD) (WA)	0.122-01	4.18
S44	- 5.123	- 3.08
S31	- 1.897	- 2.01
(CONSTANT)	5.905	11.39

TABLE E-7

DEPENDENT VARIABLE: kWh/Customer in 1975SAMPLE SIZE: 102 SMSA'sINDEPENDENT VARIABLES:

(HUM)(WB), Humidity in 1975 times weighted
average of electric appliance saturation
rates excluding air conditioning.
P nominal electricity price in 1975
S's are state shift dummy variables
(WAC)(CDD) Cooling degree days in 1975 times
the percentage of houses with air condi-
tioning, a weather variable.
(WAC)(P) nominal electricity price in 1975
times percentage of houses with air
conditioning

FUNCTIONAL FORM:

LINEAR MODEL

Multiple R	0.839
R Square	0.704
Adjusted R Square	0.679

-----VARIABLES IN THE EQUATION-----

VARIABLE	B	<u>t-VALUE</u> SIGNIFICANCE
(HUM) (WB)	0.393	8.56
P	-0.652	- 3.90
(WAC) (CDD)	0.556-02	7.83
S37	3.482	3.52
S44	-6.125	- 3.45
(WAC) (P)	-0.789-01	- 2.96
S61	4.053	2.41
S33	1.597	1.86
(CONSTANT)	6.597	13.43

TABLE E-8

DEPENDENT VARIABLE: kWh/Customer in 1975SAMPLE SIZE: 40 SMSA'sINDEPENDENT VARIABLES:Same as previous table except all prices are
in real terms (deflated)FUNCTIONAL FORM:

LINEAR MODEL

Multiple R	0.981
R Square	0.962
Adjusted R Square	0.952

-----VARIABLES IN THE EQUATION-----

VARIABLE	B	t-VALUE SIGNIFICANCE
(HUM) (WB)	0.384	11.53
S37	11.964	14.66
S58	4.502	6.32
S33	2.663	5.44
(WAC) (CDD)	0.726-02	8.38
P	- 0.390	- 3.21
(WAC) (P)	- 0.821-01	- 4.71
S44	- 5.148	- 3.82
(CONSTANT)	5.491	13.06

TABLE S-1

DEPENDENT VARIABLE: % of houses with
electric water heating fuel in 1970

SAMPLE SIZE: 102 SMSA's

INDEPENDENT VARIABLES:

S's are state shift dummy variables
%EWHF60 is the percentage of houses with
electric heating fuel 10 years earlier
(1960, a distributed lag effect)
P60 is the nominal price of electricity
in 1960
GP60 is the nominal price of natural gas
in 1960

FUNCTIONAL FORM:

LINEAR MODEL

Multiple R 0.944
R Square 0.801
Adjusted R Square 0.873

-----VARIABLES IN THE EQUATION-----

VARIABLE	B	<u>t-VALUE</u> SIGNIFICANCE
GP60	0.789-02	2.89
S61	0.696	8.71
%EWHF60	0.204-01	4.14
S40	-1.161	-3.07
S54	0.446	8.31
S67	0.568	6.93
S47	0.456	8.99
S31	0.164	4.46
S48	0.424	6.21
S68	0.487	5.44
S44	0.406	5.95
S49	0.223	4.68
S34	0.113	2.76
P60	-0.379-07	-2.37
(CONSTANT)	0.658-01	2.64

TABLE S-2

DEPENDENT VARIABLE: % of houses with an
electric dryer in 1970

SAMPLE SIZE: 102 SMSA's

INDEPENDENT VARIABLES:

S's are state shift dummy variables
AVHDD the average heating degree days,
P60 is nominal electricity price in 1960
BEARLY is the percentage of houses built
before 1939
AVDB is average temperature using a dry
bulb thermometer

FUNCTIONAL FORM:

LINEAR MODEL

Multiple R 0.878
R Square 0.771
Adjusted R Square 0.731

-----VARIABLES IN THE EQUATION-----

VARIABLE	B	<u>t-VALUE</u> SIGNIFICANCE
AVHDD	0.478-04	6.05
P60	-0.612-07	-5.34
S25	0.357	6.47
S68	0.235	4.09
S67	0.275	4.97
BEARLY	-0.341	-5.73
S61	0.212	3.87
S50	0.195	3.56
AVDB	-0.5608-02	-3.70
S33	0.101	3.66
S54	0.104	3.25
S62	0.123	3.07
S39	0.114	2.90
S31	0.702-01	2.80
S29	0.614-01	2.27
(CONSTANT)	0.804	5.54

TABLE S-3

DEPENDENT VARIABLE: % of houses with
electric heating fuel in 1970

SAMPLE SIZE: 102 SMSA's

INDEPENDENT VARIABLES:

S's are state shift dummy variables

B6568 is the percentage of houses built
between 1965 and 1968

AVHDD is the average heating degree days

GP60 is the nominal price of utility gas in 1960

FUNCTIONAL FORM:

LINEAR MODEL

Multiple R	0.865
R Square	0.749
Adjusted R Square	0.731

-----VARIABLES IN THE EQUATION-----

VARIABLE	B	t-VALUE SIGNIFICANCE
S54	0.311	9.88
S44	0.242	5.02
B6568	0.578	3.48
S67	0.199	3.73
S68	0.188	3.47
AVHDD	-0.180-04	-3.24
GP60	0.423-02	2.35
(CONSTANT)	0.655-02	0.21

TABLE S-4

DEPENDENT VARIABLE: % of houses with
air conditioning in 1970

SAMPLE SIZE: 102 SMSA's

INDEPENDENT VARIABLES:

AVDB is average dry bulb temperature
AVWB is average wet bulb temperature
P60 is the nominal electricity price in 1960
S's are the state shift dummy variables
B6568 is the percentage of houses built
between 1965 and 1968

FUNCTIONAL FORM:

LINEAR MODEL

Multiple R 0.774
R Square 0.594
Adjusted R Square 0.573

-----VARIABLES IN THE EQUATION-----

VARIABLE	B	<u>t-VALUE</u> SIGNIFICANCE
AVDB	0.225-01	6.35
AVWB	0.164-01	4.42
P60	0.115-06	4.03
S54	-0.230	-2.74
B6568	0.828	2.11
S31	0.136	2.08
(CONSTANT)	-2.920	-9.59

TABLE S-5

DEPENDENT VARIABLE: % of houses with electric cooking fuel in 1970

SAMPLE SIZE: 102 SMSA's

INDEPENDENT VARIABLES:

P60 is nominal electricity price in 1960

B6064 is the percentage of houses built between 1960 and 1964

%ECF60 is the percentage of houses with electric cooking 10 years earlier (1960, a distributed lag effect)

GP is the nominal price of utility gas in 1960

S's are state shift dummy variables

FUNCTIONAL FORM:

LINEAR MODEL

Multiple R	0.891
R Square	0.794
Adjusted R Square	0.749

-----VARIABLES IN THE EQUATION-----

VARIABLE	B	<u>t-VALUE</u> SIGNIFICANCE
P60	-0.127-06	-6.38
B6064	1.067	4.62
%ECF60	0.122-01	3.17
S40	-0.794	-2.28
S61	0.414	4.21
S58	-0.129	-3.23
S56	-0.202	-3.44
S25	-0.371	-3.77
S67	0.378	3.83
S54	0.217	3.69
S68	0.333	3.25
S27	-0.213	-2.99
GP60	0.145-01	4.12
S42	-0.235	-2.35
S62	0.201	2.82

TABLE S-5 (cont'd)

-----VARIABLES IN THE EQUATION-----		
VARIABLE	B	<u>t-VALUE</u> SIGNIFICANCE
S47	0.171	2.80
S48	0.199	2.62
S64	0.241	2.43
(CONSTANT)	0.184	3.82

TABLE S-6

DEPENDENT VARIABLE: % of households with
automatic washing machines in 1970

SAMPLE SIZE: 102 SMSA's

INDEPENDENT VARIABLES:

S's are state shift dummy variables
P60 is the nominal electricity price in 1960

FUNCTIONAL FORM:

LINEAR MODEL

Multiple R	0.793
R Square	0.568
Adjusted R Square	0.516

-----VARIABLES IN THE EQUATION-----

VARIABLE	B	<u>t-VALUE</u> SIGNIFICANCE
S25	-0.321	-6.67
P60	-0.398-07	-4.13
S21	0.732-01	2.59
S56	0.703-01	2.49
S40	-0.143	-2.96
S31	-0.716-01	-3.22
S30	-0.791-01	-2.78
S58	-0.489-01	-2.58
S38	-0.687-01	-2.44
S41	-0.108	-2.23
S35	-0.675-01	-1.96
(CONSTANT)	0.658	105.92

TABLE S-7

DEPENDENT VARIABLE: % of houses with food
freezer in 1970

SAMPLE SIZE: 102 SMSA's

INDEPENDENT VARIABLES:

S's are state shift dummy variables

P60 is the nominal price of electricity in 1960

%FF60 is the percentage of houses with a
food freezer 10 years earlier (1960, a
distributed lag effect)

BEARLY is the percentage of houses built
before 1939

FUNCTIONAL FORM:

LINEAR MODEL

Multiple R	0.942
R Square	0.888
Adjusted R Square	0.855

-----VARIABLES IN THE EQUATION-----

VARIABLE	B	t-VALUE SIGNIFICANCE
S25	0.654	15.89
P60	-0.631-07	- 7.66
S22	-0.104	- 4.58
S24	-0.135	- 4.54
S62	0.158	5.47
S61	0.190	4.69
S56	0.102	4.24
%FF60	0.356-02	4.37
S44	-0.146	- 4.86
S27	-0.992-01	- 3.37
S21	-0.768-01	- 3.19
S34	0.883-01	4.16
S37	0.992-01	4.11
S67	0.132	3.27
S23	-0.876-01	- 2.10

TABLE S-7 (cont'd)

-----VARIABLES IN THE EQUATION-----		
VARIABLE	B	<u>t-VALUE</u> SIGNIFICANCE
S53	0.877-01	2.15
S59	-0.955-01	- 3.20
BEARLY	-0.111	- 3.33
S52	-0.591-01	- 2.48
S49	-0.577-01	- 2.42
S41	0.917-01	2.25
S30	0.515-01	2.12
S68	0.837-01	2.07
(CONSTANT)	0.325	25.44

TABLE S-8

DEPENDENT VARIABLE: % of houses with a
dishwasher in 1970

SAMPLE SIZE: 102 SMSA's

INDEPENDENT VARIABLES:

S's are state shift dummy variables

B6064 is the percentage of houses built between
1960 and 1964

BEARLY is the percentage of houses built
before 1939

FUNCTIONAL FORM:

LINEAR MODEL

Multiple R	0.916
R Square	0.840
Adjusted R Square	0.819

-----VARIABLES IN THE EQUATION-----

VARIABLE	B	<u>t-VALUE</u> SIGNIFICANCE
S25	0.688	17.06
B6064	1.055	5.18
S67	0.196	4.90
S68	0.192	4.79
S60	0.118	4.08
S66	0.797-01	3.95
S42	0.146	3.62
S61	0.130	3.23
S58	0.617-01	3.40
S45	0.113	2.79
S21	0.661-01	2.79
BEARLY	0.149	2.48
(CONSTANT)	-0.723-03	-0.02

APPENDIX III

DEFINITION OF VARIABLES IN EXPLORATORY DATA SET

1. 1975 Gas Price (AGA Confidential)
2. 1975 Propane Price (AGA Confidential)
3. 1975 Electricity Price (AGA Confidential)
4. 1975 No. 2 Oil Price (AGA Confidential)
5. 1975 No. 1 Oil Price (AGA Confidential)
6. 1975 Coal Price (AGA Confidential)
7. Population per Square Mile
8. Median Age
9. Median Income
10. 1975 Average Humidity
11. 1975 Heating Degree Days
12. 1975 Cooling Degree Days
13. Average Heating Degree Days
14. Percent Sunshine
15. Average Dry Bulb Humidity
16. Average Wet Bulb Humidity
17. Elevation
18. 1960 Gas Price (AGA Confidential)
19. 1960 No. 2 Oil Price (AGA Confidential)
20. 1960 No. 1 Oil Price (AGA Confidential)
21. 1960 Coal Price (AGA Confidential)
22. 1960 Coal Price (AGA Confidential)
23. 1960 Coal Price (AGA Confidential)
24. 1960 Coal Price (AGA Confidential)
25. 1960 Propane Price (AGA Confidential)

26. 1960 Coal Price (AGA Confidential)
27. 1960 Electricity Price (AGA Confidential)
28. Total Houses in 1960
29. Number of houses with gas heat in 1960
30. Number of houses with oil heat in 1960
31. Number of houses with coal heat in 1960
32. Number of houses with electric heat in 1960
33. Number of houses with propane heat in 1960
34. Number of houses with other heat fuel in 1960
35. Number of houses with no heat source in 1960
36. Number of houses with gas water heat in 1960
37. Number of houses with electric water heat in 1960
38. Number of houses with coal water heat in 1960
39. Number of houses with propane water heat in 1960
40. Number of houses with oil water heat in 1960
41. Number of houses with other water heat in 1960
42. Number of houses with no water heat in 1960
43. Number of houses with gas cooking fuel in 1960
44. Number of houses with electric cooking fuel in 1960
45. Number of houses with propane cooking fuel in 1960
46. Number of houses with oil cooking fuel in 1960
47. Number of houses with coal cooking fuel in 1960
48. Number of houses with other cooking fuel in 1960
49. Number of houses with no cooking fuel in 1960
50. Number of houses with wringer type washer in 1960
51. Number of houses with automatic type washer in 1960
52. Number of houses with washer-dryer in 1960

53. Number of houses with no washer in 1960
54. Number of houses with gas dryer in 1960
55. Number of houses with electric dryer in 1960
56. Number of houses without a dryer in 1960
57. Number of houses with a food freezer in 1960
58. Number of houses without a food freezer in 1960
59. Number of houses with a single air conditioner in 1960
60. Number of houses with 2 air conditioners in 1960
61. Number of houses with central air conditioning in 1960
62. Number of houses without air conditioning in 1960
63. Number of houses with one television set in 1960
64. Number of houses with 2 television sets in 1960
65. Number of houses without a television set in 1960
66. 1975 Total Revenue from Electricity Sales to the Industrial Sector
67. Dummy Variable indicating Municipal Ownership
68. Total Electric Bills 500-750 block for 1975
69. Total Electric Bills 750-1000 block for 1975
70. Total Electric Bills 1000 + block for 1975
71. Total Houses in 1970
72. Number of houses with one air conditioner in 1970
73. Number of houses with 2 air conditioners in 1970
74. Number of houses with central air conditioning in 1970
75. Median rent in 1970
76. Number of residential electric customers in 1975
77. Number of commercial electric customers in 1975
78. Number of industrial electric customers in 1975
79. kWh consumed by residential customers in 1975

80. kWh consumed by commercial customers in 1975
81. kWh consumed by industrial customers in 1975
82. 1975 Total Revenue from Electricity Sales to Residential Sector
83. 1975 Total Revenue from Electricity Sales to Commercial Sector
84. Total number of dwellings in 1970
85. Dwellings built between 69-70
86. Dwellings built between 65 and 68
87. Dwellings built between 60 and 64
88. Dwellings built between 50 and 59
89. Dwellings built between 40 and 49
90. Dwellings built prior to 40
91. Total houses in 1970
92. Number of houses with gas heating fuel in 1970
93. Number of houses with oil heating fuel in 1970
94. Number of houses with coal heating fuel in 1970
95. Number of houses with wood heating fuel in 1970
96. Number of houses with electric heating fuel in 1970
97. Number of houses with propane heating fuel in 1970
98. Number of houses with other heating fuel in 1970
99. Number of houses with no heating fuel in 1970
100. Number of houses with gas water heating fuel in 1970
101. Number of houses with oil water heating fuel in 1970
102. Number of houses with coal water heating fuel in 1970
103. Number of houses with wood water heating fuel in 1970
104. Number of houses with electric water heating fuel in 1970
105. Number of houses with propane water heating fuel in 1970
106. Number of houses with other water heating fuel in 1970

107. Number of houses with no water heating fuel in 1970
108. Number of houses with gas cooking fuel in 1970
109. Number of houses with electric cooking fuel in 1970
110. Number of houses propane cooking fuel in 1970
111. Number of houses with oil cooking fuel in 1970
112. Number of houses with coal cooking fuel in 1970
113. Number of houses with wood cooking fuel in 1970
114. Number of houses with other cooking fuel in 1970
115. Number of houses with no cooking fuel in 1970
116. Number of houses with wringer type washer in 1970
117. Number of houses with automatic type washer in 1970
118. Number of houses with no washer in 1970
119. Number of houses with gas dryer in 1970
120. Number of houses with electric dryer in 1970
121. Number of houses with no dryer in 1970
122. Number of houses with a dishwasher in 1970
123. Number of houses without a dishwasher in 1970
124. Number of houses with a food freezer in 1970
125. Number of houses without a food freezer in 1970
126. Number of houses with one television set in 1970
127. Number of houses with 2 television sets in 1970
128. Number of houses without a television set in 1970

APPENDIX IV

ELECTRICITY CONSUMPTION FORECASTS, INDEPENDENT VARIABLE PROJECTIONS,
AND SENSITIVITY ANALYSIS FOR 136 UTILITY SERVICE AREAS

OBSERVATION NUMBER IS: 1

UTILITY NAME: ALABAMA POWER CO.

CITY NAME: BIRMINGHAM

(FEA REGION 4)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	38.17	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	42.82	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	2.26	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	7.15	\$/MILLION BTU
1975 FAMILY INCOME	10644.75	\$/YEAR	PROJECTED 1985 FAMILY INCOME	14204.41	\$/YEAR
1975 HEATING DEGREE DAYS	1437.		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	1580.	
1975 NUMBER OF CUSTOMERS	777974		PROJECTED 1985 NUMBER OF CUSTOMERS	817600	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE - .823 THOUSAND KWH
 CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME 1.094 THOUSAND KWH
 CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE .668 THOUSAND KWH
 CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS -.233 THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	10.455	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	11.061	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0580	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	8133595.673	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	9043641.990	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.1119	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT -598179.961 THOUSAND KWH
 WHEN INCOME IS RAISED BY 10 PERCENT 302316.290 THOUSAND KWH
 WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT 88347.763 THOUSAND KWH
 WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT -215038.514 THOUSAND KWH
 WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT -955973.681 THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 2

UTILITY NAME: ARIZONA PUBLIC SERVICE CO.

CITY NAME: PHOENIX

(FEA REGION 9)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	39.67	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	45.75	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	11871.08	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	2.02	\$/MILLION BTU
1975 FAMILY INCOME	11871.08	\$/YEAR	PROJECTED 1985 FAMILY INCOME	16223.52	\$/YEAR
1975 HEATING DEGREE DAYS	820.		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	862.	
1975 NUMBER OF CUSTOMERS	279314		PROJECTED 1985 NUMBER OF CUSTOMERS	313300	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-1.252	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	1.464	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	1.033	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-0.097	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	12.865	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	13.867	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0779	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	3583266.633	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	4344478.647	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.2091	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-287359.901	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	145229.838	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	42441.416	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-66259.873	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-311030.339	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 3

UTILITY NAME: SALT RIVER PROJECT

CITY NAME: PHOENIX

(FEA REGION 9)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	39.67	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	45.75	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	11871.08	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	20.02	\$/MILLION BTU
1975 FAMILY INCOME	620	\$/YEAR	PROJECTED 1985 FAMILY INCOME	16223.52	\$/YEAR
1975 HEATING DEGREE DAYS	224159	820	EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	862	862
1975 NUMBER OF CUSTOMERS	224159		PROJECTED 1985 NUMBER OF CUSTOMERS	251400	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-1.252	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	1.464	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	1.033	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-0.097	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	12.865	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	13.867	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0779	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	2883718.680	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	3486121.719	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.2089	

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-230584.995	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	116536.168	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	34056.087	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-53168.631	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-249578.765	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

OBSERVATION NUMBER IS: 4

UTILITY NAME: TUCSON GAS AND ELECTRIC

CITY NAME: TUCSON

(FEA REGION 9)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	57.19	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	65.96	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	.95	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	2.02	\$/MILLION BTU
1975 FAMILY INCOME	10790.39	\$/YEAR	PROJECTED 1985 FAMILY INCOME	15111.70	\$/YEAR
1975 HEATING DEGREE DAYS	1110.		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	973.	
1975 NUMBER OF CUSTOMERS	131010		PROJECTED 1985 NUMBER OF CUSTOMERS	137000	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-0.885	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	1.121	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.731	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	.219	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	9.097	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	10.204	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.1217	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1191776.615	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	1397904.833	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.1730	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-92462.601	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	46730.001	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	13656.198	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-23504.744	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-109440.062	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 5

UTILITY NAME: SOUTH CALIFORNIA EDISON

CITY NAME: ANAHEIM

(FEA REGION 9)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	46.20	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	53.26	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.90	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	4.04	\$/MILLION BTU
1975 FAMILY INCOME	13365.00	\$/YEAR	PROJECTED 1985 FAMILY INCOME	18185.58	\$/YEAR
1975 HEATING DEGREE DAYS	877	DAYS	EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	1010	DAYS
1975 NUMBER OF CUSTOMERS	2412676		PROJECTED 1985 NUMBER OF CUSTOMERS	2765600	

STATE DUMMY VARIABLE IS RELEVANT, STATE IS: CALIFORNIA

MONETARY VARIABLES ARE DEFLATED BY A REAL PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-.475	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	.589	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.392	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-.113	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	4.876	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	5.206	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0676	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	11766276.043	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	14397635.461	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.2236	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-952312.909	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	481292.795	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	140651.177	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-249297.343	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-1157592.848	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 6

UTILITY NAME: LOS ANGELES DEPT. OF WATER AND POWER

CITY NAME: LOS ANGELES (FFA REGION 9)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	41.43	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	47.78	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.90	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	4.04	\$/MILLION BTU
1975 FAMILY INCOME	13065.00	\$/YEAR	PROJECTED 1985 FAMILY INCOME	16185.56	\$/YEAR
1975 HEATING DEGREE DAYS	877		PROJECTED 1985 HEATING DEGREE DAYS	1010	
1975 NUMBER OF CUSTOMERS	959793		PROJECTED 1985 NUMBER OF CUSTOMERS	1100100	

STATE DUMMY VARIABLE IS RELEVANT, STATE IS: CALIFORNIA

MONETARY VARIABLES ARE DEFLATED BY A REAL PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-.513	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	.637	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.423	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-.123	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	5.273	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	5.629	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0676	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	5060818.806	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	5192800.901	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.2236	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-409601.945	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	207010.178	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	60495.668	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-137225.971	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-497895.469	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 7

UTILITY NAME: COLO. SPRINGS DEPT. OF PUBLIC UTIL.

CITY NAME: COLORADO SPRINGS (FEA REGION 8)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	35.29	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	42.07	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	11.26	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	1.52	\$/MILLION BTU
1975 FAMILY INCOME	1126.00	\$/YEAR	PROJECTED 1985 FAMILY INCOME	15844.29	\$/YEAR
1975 HEATING DEGREE DAYS	3556		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	3596	
1975 NUMBER OF CUSTOMERS	70343		PROJECTED 1985 NUMBER OF CUSTOMERS	64000	

STATE CUMMY VARIABLE IS RELEVANT, STATE IS: COLORADO

MONETARY VARIABLES ARE DEFLATED BY A REAL PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-.631	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	.709	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.479	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-.018	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	5.322	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	5.774	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0851	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	374330.886	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	369547.840	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	.9872	

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-24443.262	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	12353.467	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	3610.130	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-10396.174	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-34534.034	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

OBSERVATION NUMBER IS: 8

UTILITY NAME: PUBLIC SERVICE CO. OF COLORADO

CITY NAME: DENVER

(FEA REGION 8)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	41.64	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	49.64	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.23	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	2.87	\$/MILLION BTU
1975 FAMILY INCOME	13237.00	\$/YEAR	PROJECTED 1985 FAMILY INCOME	17747.55	\$/YEAR
1975 HEATING DEGREE DAYS	3398.		PROJECTED 1985 HEATING DEGREE DAYS	3342.	
1975 NUMBER OF CUSTOMERS	564758		PROJECTED 1985 NUMBER OF CUSTOMERS	619900	

STATE DUMPY VARIABLE IS RELEVANT, STATE IS: COLORADO

MONETARY VARIABLES ARE DEFLATED BY A REAL PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-0.623	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	.587	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.496	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	.029	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	5.510	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	5.886	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0687	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	3111675.246	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	3649964.680	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.1736	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-241423.512	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	122013.884	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	35656.874	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-106427.379	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-378451.681	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 9

UTILITY NAME: COLORADO - UTE ELECTRIC ASSOC.

CITY NAME: COLORADO SPRINGS (FEA REGION 8)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	35.29	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	42.07	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	.65	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	1.52	\$/MILLION BTU
1975 FAMILY INCOME	11026.00	\$/YEAR	PROJECTED 1985 FAMILY INCOME	15494.95	\$/YEAR
1975 HEATING DEGREE DAYS	3556		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	3596	
1975 NUMBER OF CUSTOMERS	72709		PROJECTED 1985 NUMBER OF CUSTOMERS	62400	

STATE DUMMY VARIABLE IS RELEVANT, STATE IS: COLORADO

ACNETARY VARIABLES ARE DEFLATED BY A REAL PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-.631	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	.663	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.479	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-.018	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	5.322	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	5.730	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0768	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	386921.575	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	357546.319	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	.9241	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-23649.569	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	11952.346	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	3492.906	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-10058.602	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-33412.666	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 10

UTILITY NAME: DELMARVA POWER AND LIGHT

CITY NAME: WILMINGTON

(FEA REGION 3)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	54.66	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	56.81	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	2.21	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	3.60	\$/MILLION BTU
1975 FAMILY INCOME	7946.17	\$/YEAR	PROJECTED 1985 FAMILY INCOME	11221.28	\$/YEAR
1975 HEATING DEGREE DAYS	2531		PROJECTED (AVERAGE) 1985 HEATING DEGREE DAYS	2744	
1975 NUMBER OF CUSTOMERS	146248		PROJECTED 1985 NUMBER OF CUSTOMERS	154400	

STATE DUMMY VARIABLE IS RELEVANT, STATE IS: DELAWARE

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-.210	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	.969	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.391	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-.191	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	7.661	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	8.601	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.1228	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1120368.515	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	1328063.349	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.1854	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-87843.026	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	44395.298	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	12973.913	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-39553.287	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-156314.833	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 11

UTILITY NAME: POTOMAC ELECTRIC POWER CO.

CITY NAME: WASHINGTON DC

(FEA REGION 3)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	44.97	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	46.74	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	2.57	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	4.19	\$/MILLION BTU
1975 FAMILY INCOME	10565.06	\$/YEAR	PROJECTED 1985 FAMILY INCOME	13517.01	\$/YEAR
1975 HEATING DEGREE DAYS	435728	1998.	EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	2783.	
1975 NUMBER OF CUSTOMERS	405728		PROJECTED 1985 NUMBER OF CUSTOMERS	529800	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A REAL

PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	-.221
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.715
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-.411
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-.765

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	8.059	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	8.117	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0073	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	3269663.848	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	4300516.096	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.3153	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-284452.055	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	143760.232	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	42011.944	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-128235.323	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-504057.606	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 12

UTILITY NAME: GULF POWER CO.

CITY NAME: ORLANDO

(FEA REGION 4)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	47.86	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	53.69	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	2.64	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	4.85	\$/MILLION BTU
1975 FAMILY INCOME	11746.00	\$/YEAR	PROJECTED 1985 FAMILY INCOME	16399.72	\$/YEAR
1975 HEATING DEGREE DAYS	246.		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	407.	
1975 NUMBER OF CUSTOMERS	154170		PROJECTED 1985 NUMBER OF CUSTOMERS	150500	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A REAL

PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-0.937	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	1.443	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	0.755	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-0.371	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	11.825	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	12.584	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0646	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1823100.827	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	1894675.372	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.0393	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-125320.843	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	63336.345	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	18309.173	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-14959.240	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-72584.654	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 13

UTILITY NAME: TAMPA ELECTRIC CO.

CITY NAME: ORLANDO

(FEA REGION 4)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	47.86	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	53.69	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	2.64	\$/THOUSAND BTU	PROJECTED 1985 NATURAL GAS PRICE	4.82	\$/THOUSAND BTU
1975 FAMILY INCOME	11746.00	\$/YEAR	PROJECTED 1985 FAMILY INCOME	15880.92	\$/YEAR
1975 HEATING DEGREE DAYS	246.		PROJECTED 1985 HEATING DEGREE DAYS	407.	
1975 NUMBER OF CUSTOMERS	239215		PROJECTED 1985 NUMBER OF CUSTOMERS	276500	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A REAL

PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-0.937	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	1.298	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	0.755	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-0.371	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	11.825	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	12.452	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0530	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	2628780.336	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	3442975.589	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.2171	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-227731.151	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	115093.853	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	33634.590	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-27183.796	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-131899.741	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 14

UTILITY NAME: GEORGIA POWER CO.

CITY NAME: ATLANTA

(FEA REGION 4)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	41.58	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	46.65	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.60	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	2.94	\$/MILLION BTU
1975 FAMILY INCOME	13655.00	\$/YEAR	PROJECTED 1985 FAMILY INCOME	19157.62	\$/YEAR
1975 HEATING DEGREE DAYS	1574.		PROJECTED 1985 HEATING DEGREE DAYS	1719.	
1975 NUMBER OF CUSTOMERS	943236		PROJECTED 1985 NUMBER OF CUSTOMERS	1048000	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A REAL

PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-0.819	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	1.281	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-0.226	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	10.336	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	11.130	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0769	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	9748947.992	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	11664181.558	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.1965	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-771512.149	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	389917.259	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	113947.938	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-291601.420	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-1281702.903	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 15

UTILITY NAME: CENTRAL ILLINOIS LIGHT CO.

CITY NAME: PEORIA

(FEA REGION 5)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	42.62	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	47.16	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.93	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	3.39	\$/MILLION BTU
1975 FAMILY INCOME	12439.79	\$/YEAR	PROJECTED 1985 FAMILY INCOME	16054.56	\$/YEAR
1975 HEATING DEGREE DAYS	3333.		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	3387.	
1975 NUMBER OF CUSTOMERS	149185		PROJECTED 1985 NUMBER OF CUSTOMERS	159200	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-0.502	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	.659	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.423	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-0.036	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	7.168	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	7.670	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0700	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1069365.240	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	1221014.366	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.1418	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-80762.410	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	40818.891	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	11928.147	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-35421.181	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-1244620.061	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 16

UTILITY NAME: CENTRAL ILLINOIS PUBLIC SERVICE CO.

CITY NAME: DECATUR (FEA REGION 5)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	36.73	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	40.63	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.56	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	2.73	\$/MILLION BTU
1975 FAMILY INCOME	11377.00	\$/YEAR	PROJECTED 1985 FAMILY INCOME	15720.52	\$/YEAR
1975 HEATING DEGREE DAYS	2932.		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	3067.	
1975 NUMBER OF CUSTOMERS	246602		PROJECTED 1985 NUMBER OF CUSTOMERS	284800	

STATE DUMPY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A REAL PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-.557	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	.808	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.469	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-.129	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	7.954	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	8.489	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0672	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1977459.147	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	2417659.624	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.2226	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-159912.958	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	80616.676	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	23616.239	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-71681.299	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-269243.274	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 17

UTILITY NAME: COMMONWEALTH EDISON CO.

CITY NAME: CHICAGO

(FLEA REGION 5)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

	1975 ELECTRICITY PRICE 1975 NATURAL GAS PRICE 1975 FAMILY INCOME 1975 HEATING DEGREE DAYS 1975 NUMBER OF CUSTOMERS	43.39 1.93 13734.00 3350. 2516854	\$/THOUSAND KWH \$/MILLION BTU \$/YEAR DAYS NUMBER OF CUSTOMERS	PROJECTED 1985 ELECTRICITY PRICE PROJECTED 1985 NATURAL GAS PRICE PROJECTED 1985 FAMILY INCOME EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS PROJECTED 1985 NUMBER OF CUSTOMERS	48.00 3.38 19138.74 2683800 2683800	\$/THOUSAND KWH \$/MILLION BTU \$/YEAR DAYS NUMBER OF CUSTOMERS
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STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A REAL PRICE INDEX

DEMAND COMPONENT ANALYSIS

	CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-0.500 -0.867 -0.422 -0.036	THOUSAND KWH THOUSAND KWH THOUSAND KWH THOUSAND KWH
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NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

	1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY 1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	7.146 7.652 1.0988	THOUSAND KWH THOUSAND KWH THOUSAND KWH
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	1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA 1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	17986639.614 22644281.071 1.2590	THOUSAND KWH THOUSAND KWH THOUSAND KWH
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CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

	WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT WHEN INCOME IS RAISED BY 10 PERCENT WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-1497776.579 756966.612 221213.045 -655546.514 -2296772.683	THOUSAND KWH THOUSAND KWH THOUSAND KWH THOUSAND KWH THOUSAND KWH
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NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

OBSERVATION NUMBER IS: 18

UTILITY NAME: SPRINGFIELD WATER, LIGHT, POWER DEP

CITY NAME: DECATUR (FEA REGION 5)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

	1975 ELECTRICITY PRICE	36.73	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	40.63	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.56	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	2.73	\$/MILLION BTU	
1975 FAMILY INCOME	11877.00	\$/YEAR	PROJECTED 1985 FAMILY INCOME	15575.43	\$/YEAR	
1975 HEATING DEGREE DAYS	2932		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	3087		
1975 NUMBER OF CUSTOMERS	43747		PROJECTED 1985 NUMBER OF CUSTOMERS	51900		

STATE DUMPY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A REAL

PRICE INDEX

DEMAND COMPONENT ANALYSIS

	1975 ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-.557	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	.760	THOUSAND KWH	
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.489	THOUSAND KWH	
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-.129	THOUSAND KWH	

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

	1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	7.954	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	8.462	THOUSAND KWH	
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0638		
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	347977.520	THOUSAND KWH	
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	439170.607	THOUSAND KWH	
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.2621		

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

	1975 ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	347977.520	THOUSAND KWH
WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-29048.370	THOUSAND KWH	
WHEN INCOME IS RAISED BY 10 PERCENT	14680.558	THOUSAND KWH	
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	4290.278	THOUSAND KWH	
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-13057.319	THOUSAND KWH	
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-48908.345	THOUSAND KWH	

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 19

UTILITY NAME: ILLINOIS POWER CO.

CITY NAME: DECATUR

(FEA REGION 5)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	36.73	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	40.63	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.56	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	2.73	\$/MILLION BTU
1975 FAMILY INCOME	11877.00	\$/YEAR	PROJECTED 1985 FAMILY INCOME	16811.00	\$/YEAR
1975 HEATING DEGREE DAYS	2932.		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	3087.	
1975 NUMBER OF CUSTOMERS	422706		PROJECTED 1985 NUMBER OF CUSTOMERS	465000	

STATE DUMMY VARIABLE IS NOT RELEVANT

MUNETARY VARIABLES ARE DEFLATED BY A REAL

PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-557	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	1.013	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.469	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-.129	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	7.954	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	8.688	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0922	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	3362337.661	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	4039821.575	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.2015	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-267208.754	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	135045.579	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	39465.207	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-12011.044	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-449895.750	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 20

UTILITY NAME: INDIANA AND MICHIGAN ELECTRIC CO.

CITY NAME: FORT WAYNE (F&A REGION 5)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	31.83	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	35.22	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.63	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	2.87	\$/MILLION BTU
1975 FAMILY INCOME	13018.33	\$/YEAR	PROJECTED 1985 FAMILY INCOME	18659.69	\$/YEAR
1975 HEATING DEGREE DAYS	3347.		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	3449.	
1975 NUMBER OF CUSTOMERS	371217		PROJECTED 1985 NUMBER OF CUSTOMERS	423900	

STATE DUMPY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-.668	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME PRICE	1.261	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.563	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-.089	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	9.535	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	10.533	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.1046	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	3539582.696	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	4464786.113	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.2614	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-295317.482	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	149251.549	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	43616.705	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-128502.995	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-445107.625	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 21

UTILITY NAME: INDIANA AND MICHIGAN ELECTRIC CO.

CITY NAME: MUNCIE

(FLEA REGION 5)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	31.83	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	35.22	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.66	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	2.90	\$/MILLION BTU
1975 FAMILY INCOME	11302.19	\$/YEAR	PROJECTED 1985 FAMILY INCOME	16199.87	\$/YEAR
1975 HEATING DEGREE DAYS	2976.		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	3098.	
1975 NUMBER OF CUSTOMERS	371217		PROJECTED 1985 NUMBER OF CUSTOMERS	423900	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-0.682	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	1.289	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-0.124	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	9.744	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	10.727	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.1009	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	3617160.819	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	4547312.706	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.2571	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-300776.096	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	152013.297	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	44422.911	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-135130.993	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-505146.157	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 22

UTILITY NAME: INDIANA STATEWIDE RURAL ELECT. COOP

CITY NAME: EVANSVILLE (FEA REGION 5)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	36.23	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	40.09	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.54	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	2.69	\$/MILLION BTU
1975 FAMILY INCOME	1341.08	\$/YEAR	PROJECTED 1985 FAMILY INCOME	16070.15	\$/YEAR
1975 HEATING DEGREE DAYS	2380		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	2569	
1975 NUMBER OF CUSTOMERS	112168		PROJECTED 1985 NUMBER OF CUSTOMERS	126400	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-0.636	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	1.164	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	0.538	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-0.211	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	9.112	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	9.865	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0849	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1022046.311	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	1249509.329	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.2226	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-82647.173	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	41769.347	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	12206.515	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-36848.437	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-148939.430	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 23

UTILITY NAME: INDIANAPOLIS POWER AND LIGHT CO.

CITY NAME: INDIANAPOLIS

(FEA REGION 5)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

	1975 ELECTRICITY PRICE	29.07	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	32.16	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	2.40	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	2.21	\$/MILLION BTU	
1975 FAMILY INCOME	12888.00	\$/YEAR	PROJECTED 1985 FAMILY INCOME	18298.24	\$/YEAR	
1975 HEATING DEGREE DAYS	2976		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	3098		
1975 NUMBER OF CUSTOMERS	270641		PROJECTED 1985 NUMBER OF CUSTOMERS	315200		

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A REAL PRICE INDEX

DEMAND COMPONENT ANALYSIS

	CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-0.791	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME <td>1.453 <td>THOUSAND KWH</td> </td>	1.453 <td>THOUSAND KWH</td>	THOUSAND KWH	
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE <td>0.667 <td>THOUSAND KWH</td> </td>	0.667 <td>THOUSAND KWH</td>	THOUSAND KWH	
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS <td>-0.144 <td>THOUSAND KWH</td> </td>	-0.144 <td>THOUSAND KWH</td>	THOUSAND KWH	

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

	1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	11.362	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	12.401 <td>THOUSAND KWH</td>	THOUSAND KWH	
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0973		
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	3058694.723 <td>THOUSAND KWH</td>	THOUSAND KWH	
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	3908921.725 <td>THOUSAND KWH</td>	THOUSAND KWH	
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.2780		

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

	WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-258550.554	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	130609.780 <td>THOUSAND KWH</td>	THOUSAND KWH	
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	38186.440 <td>THOUSAND KWH</td>	THOUSAND KWH	
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-116159.330 <td>THOUSAND KWH</td>	THOUSAND KWH	
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-434229.382 <td>THOUSAND KWH</td>	THOUSAND KWH	

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 24

UTILITY NAME: NORTHERN INDIANA PUBLIC SERVICE

CITY NAME: CHICAGO

(FCA REGION 5)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

	1975 ELECTRICITY PRICE	43.39	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	48.00	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.93	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	3.38	\$/MILLION BTU	
1975 FAMILY INCOME	13734.00	\$/YEAR	PROJECTED 1985 FAMILY INCOME	19680.50	\$/YEAR	
1975 HEATING DEGREE DAYS	3350		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	3404		
1975 NUMBER OF CUSTOMERS	300617		PROJECTED 1985 NUMBER OF CUSTOMERS	319100		

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A REAL

PRICE INDEX

DEMAND COMPONENT ANALYSIS

	CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-0.500	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME		.944	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE		.422	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS		-0.036	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

	1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	7.146	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	7.926 <td>THOUSAND KWH</td>	THOUSAND KWH	
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.1094		
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	2146352.547 <td>THOUSAND KWH</td>	THOUSAND KWH	
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	2529695.649 <td>THOUSAND KWH</td>	THOUSAND KWH	
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.1776		

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

	CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	THOUSAND KWH
WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-167336.664	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	84570.869	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	24714.669	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-73239.873	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-256603.210	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 25

UTILITY NAME: PUBLIC SERVICE CO. OF INDIANA

CITY NAME: LAFAYETTE

(FEA REGION 5)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	31.85	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	35.24	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.60	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	2.80	\$/MILLION BTU
1975 FAMILY INCOME	11803.53	\$/YEAR	PROJECTED 1985 FAMILY INCOME	16708.19	\$/YEAR
1975 HEATING DEGREE DAYS	2976		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	3098	
1975 NUMBER OF CUSTOMERS	429186		PROJECTED 1985 NUMBER OF CUSTOMERS	495200	

STATE DUMPY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-690	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	1.255	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.581	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-.125	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	9.850	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	10.797	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0962	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	4227403.684	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	5346703.961	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.2648	

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT
 WHEN INCOME IS RAISED BY 10 PERCENT
 WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT
 WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT
 WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

-353650.793	THOUSAND KWH
178732.828	THOUSAND KWH
52232.202	THOUSAND KWH
-158885.134	THOUSAND KWH
-593947.927	THOUSAND KWH

OBSERVATION NUMBER IS: 26

UTILITY NAME: SOUTHERN INDIANA GAS AND ELECTRIC

CITY NAME: EVANSVILLE

(FEA REGION 5)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	36.23	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	40.09	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.54	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	2.69	\$/MILLION BTU
1975 FAMILY INCOME	11341.08	\$/YEAR	PROJECTED 1985 FAMILY INCOME	14541.32	\$/YEAR
1975 HEATING DEGREE DAYS	2380.	DAYS	EXPECTED 1985 HEATING DEGREE DAYS	2569.	DAYS
1975 NUMBER OF CUSTOMERS	80603		PROJECTED 1985 NUMBER OF CUSTOMERS	92600	

STATE DUPHY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-.638	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	.816	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.538	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-.211	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	9.112	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	9.550	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0481	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	734434.053	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	884351.478	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.2041	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-58494.281	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	29562.632	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	8639.271	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-26079.813	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-105413.223	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 27

UTILITY NAME: INTERSTATE POWER CO.

CITY NAME: SIOUX CITY

(FEA REGION 7)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	44.67	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	49.87	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.23	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	2.40	\$/MILLION BTU
1975 FAMILY INCOME	10554.84	\$/YEAR	PROJECTED 1985 FAMILY INCOME	13951.94	\$/YEAR
1975 HEATING DEGREE DAYS	3957.		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	3862.	
1975 NUMBER OF CUSTOMERS	111464		PROJECTED 1985 NUMBER OF CUSTOMERS	113600	

STATE DUMPY VARIABLE IS RELEVANT, STATE IS: IOWA

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-.560	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	.744	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.521	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	.052	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	7.367	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	8.082	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0970	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	821129.811	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	918070.101	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.1181	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-60724.555	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	30689.798	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	8988.670	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-24392.386	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-73323.035	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 28

UTILITY NAME: IOWA ELECTRIC LIGHT AND POWER CO.

CITY NAME: DES MOINES (FLEA REGION 7)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	43.96	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	49.09	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.24	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	2.42	\$/MILLION BTU
1975 FAMILY INCOME	12648.21	\$/YEAR	PROJECTED 1985 FAMILY INCOME	17103.04	\$/YEAR
1975 HEATING DEGREE DAYS	3529.		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	3727.	
1975 NUMBER OF CUSTOMERS	156883		PROJECTED 1985 NUMBER OF CUSTOMERS	168600	

STATE DUMMY VARIABLE IS RELEVANT, STATE IS: IOWA

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-.606	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	.875	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.564	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-.132	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	7.977	THOUSAND KWH
1985 PROJECTED ELECTRICITY CONSUMPTION PER FAMILY	8.613	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0796	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1251512.395	THOUSAND KWH
1985 PROJECTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	1452096.792	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.1603	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-96046.661	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	48541.362	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	14185.243	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-39823.569	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-126525.257	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 29

UTILITY NAME: IOWA - ILLINOIS GAS AND ELECTRIC CO

CITY NAME: PEORIA

(FEA REGION 5)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	42.62	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	47.16	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.93	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	3.39	\$/MILLION BTU
1975 FAMILY INCOME	12439.76	\$/YEAR	PROJECTED 1985 FAMILY INCOME	15896.50	\$/YEAR
1975 HEATING DEGREE DAYS	3233		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	3387	
1975 NUMBER OF CUSTOMERS	136649		PROJECTED 1985 NUMBER OF CUSTOMERS	141300	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-.502	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	.633	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.423	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-.036	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	7.168	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	7.644	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0664	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	979480.326	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	1080033.994	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.1027	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-71437.447	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	36104.024	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	10550.903	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-31331.392	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-110231.219	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 30

UTILITY NAME: IOWA POWER AND LIGHT CO.

CITY NAME: DES MOINES

(FEA REGION 7)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	43.98	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	49.09	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.24	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	2.42	\$/MILLION BTU
1975 FAMILY INCOME	12648.21	\$/YEAR	PROJECTED 1985 FAMILY INCOME	17332.89	\$/YEAR
1975 HEATING DEGREE DAYS	3529.		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS		3727.
1975 NUMBER OF CUSTOMERS	181592		PROJECTED 1985 NUMBER OF CUSTOMERS	191000	

STATE DUMPY VARIABLE IS RELEVANT, STATE IS: IOWA

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-.606	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	.916	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.564	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-.132	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	7.977	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	8.652	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0846	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1448625.018	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	1652607.891	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.1406	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-109309.604	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	55244.368	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	16144.404	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-45322.747	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-143996.945	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 31

UTILITY NAME: IOWA PUBLIC SERVICE CO.

CITY NAME: SIOUX CITY

(FLEA REGION 7)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	44.67	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	49.87	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.23	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	2.40	\$/MILLION BTU
1975 FAMILY INCOME	10554.84	\$/YEAR	PROJECTED 1985 FAMILY INCOME	12650.89	\$/YEAR
1975 HEATING DEGREE DAYS	3957.		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	3862.	
1975 NUMBER OF CUSTOMERS	125577		PROJECTED 1985 NUMBER OF CUSTOMERS	123800	

STATE DUMMY VARIABLE IS RELEVANT, STATE IS: IOWA

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-.560	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	.475	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.521	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	.052	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	7.367	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	7.813	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0606	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	925097.056	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	967277.420	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.0456	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-63979.309	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	32334.730	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	9449.379	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-25699.785	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-77253.050	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 32

UTILITY NAME: MUSCATINE WATER AND POWER

CITY NAME: PEORIA

(FEA REGION 5)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	42.62	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	47.16	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.93	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	3.39	\$/MILLION BTU
1975 FAMILY INCOME	12439.79	\$/YEAR	PROJECTED 1985 FAMILY INCOME	15896.50	\$/YEAR
1975 HEATING DEGREE DAYS	3333.		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	3387.	
1975 NUMBER OF CUSTOMERS	7919		PROJECTED 1985 NUMBER OF CUSTOMERS	8200	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-.502	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	.633	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.423	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-.036	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	7.166	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	7.644	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0664	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	56762.250	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	62677.132	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.1042	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-4145.698	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	2095.209	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	612.296	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-1816.241	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-6396.999	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 33

UTILITY NAME: IOWA SOUTHERN UTILITY CO.

CITY NAME: DES MOINES

(FEA REGION 7)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	43.98	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	49.09	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.24	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	2.42	\$/MILLION BTU
1975 FAMILY INCOME	12648.21	\$/YEAR	PROJECTED 1985 FAMILY INCOME	17145.14	\$/YEAR
1975 HEATING DEGREE DAYS	3529.		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	3727.	
1975 NUMBER OF CUSTOMERS	75415		PROJECTED 1985 NUMBER OF CUSTOMERS	80400	

STATE DUMMY VARIABLE IS RELEVANT, STATE IS: IOWA

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-.606	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	.863	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.564	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-.132	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	7.977	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	8.620	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0806	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	601612.713	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	693043.761	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.1520	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-45840.480	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	23167.483	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	6770.377	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-19006.715	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-60387.092	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 34

UTILITY NAME: EMPIRE DISTRICT ELECTRIC CO.

CITY NAME: COLUMBIA

(FEA REGION 7)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	36.96	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	43.50	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	2.44	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	4.77	\$/MILLION BTU
1975 FAMILY INCOME	11723.42	\$/YEAR	PROJECTED 1985 FAMILY INCOME	16289.76	\$/YEAR
1975 HEATING DEGREE DAYS	2884		PROJECTED (AVERAGE) 1985 HEATING DEGREE DAYS	2803	
1975 NUMBER OF CUSTOMERS	76162		PROJECTED 1985 NUMBER OF CUSTOMERS	77500	

STATE CUPMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-0.642	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	1.015	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.597	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	.077	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	8.444	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	9.442	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.1182	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	643109.951	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	731768.755	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.1379	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-48403.217	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	24462.673	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	-7148.679	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-21831.275	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-855570.606	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 35

UTILITY NAME: KANSAS POWER AND LIGHT CO.

CITY NAME: TOPEKA

(FEA REGION 7)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	36.55	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	40.81	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.25	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	2.45	\$/MILLION BTU
1975 FAMILY INCOME	11750.82	\$/YEAR	PROJECTED 1985 FAMILY INCOME	15967.57	\$/YEAR
1975 HEATING DEGREE DAYS	2889	DAYS	EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	2912	DAYS
1975 NUMBER OF CUSTOMERS	217185		PROJECTED 1985 NUMBER OF CUSTOMERS	226600	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-.648	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	.948	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.601	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-.021	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	8.499	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	9.322	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0969	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1845757.639	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	2112432.993	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.1445	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-139724.138	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	70615.677	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	20636.457	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-83079.298	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-243276.591	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 36

UTILITY NAME: KANSAS GAS AND ELECTRIC CO.

CITY NAME: TOPEKA

(FEA REGION 7)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	36.55	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	40.91	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.25	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	2.45	\$/MILLION BTU
1975 FAMILY INCOME	11750.82	\$/YEAR	PROJECTED 1985 FAMILY INCOME	15167.54	\$/YEAR
1975 HEATING DEGREE DAYS	2889	DAYS	EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	2912	DAYS
1975 NUMBER OF CUSTOMERS	167013		PROJECTED 1985 NUMBER OF CUSTOMERS	162900	

STATE DUMPY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-0.646	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	.787	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.601	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-.021	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	8.499	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	9.263	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0781	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1589339.381	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	1492587.976	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	.9391	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-98725.294	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	49895.126	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	14581.162	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-44570.125	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-171692.654	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 37

UTILITY NAME: KANSAS CITY BOARD OF PUBLIC UTIL.

CITY NAME: KANSAS CITY

(FEA REGION 7)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	42.25	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	46.95	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.22	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	2.38	\$/MILLION BTU
1975 FAMILY INCOME	12853.00	\$/YEAR	PROJECTED 1985 FAMILY INCOME	17956.15	\$/YEAR
1975 HEATING DEGREE DAYS	2993		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	2867	
1975 NUMBER OF CUSTOMERS	55852		PROJECTED 1985 NUMBER OF CUSTOMERS	62400	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A REAL

PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE
 CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME
 CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE
 CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	7.628	THOUSAND KWH	1985 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	426052.730	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	8.549	THOUSAND KWH	1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	533475.368	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.1207		RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.2521	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT
 WHEN INCOME IS RAISED BY 10 PERCENT
 WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT
 WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT
 WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT

-35285.917 THOUSAND KWH
 17833.274 THOUSAND KWH
 -5211.528 THOUSAND KWH
 -15929.218 THOUSAND KWH
 -61856.204 THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 38

UTILITY NAME: BIG RIVERS RURAL ELECTRIC CO.

CITY NAME: OWENSBORO (FEA REGION 4)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	37.92	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	42.53	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.45	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	2.66	\$/MILLION BTU
1975 FAMILY INCOME	1355.04	\$/YEAR	PROJECTED 1985 FAMILY INCOME	14046.35	\$/YEAR
1975 HEATING DEGREE DAYS	2386		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	2569	
1975 NUMBER OF CUSTOMERS	39630		PROJECTED 1985 NUMBER OF CUSTOMERS	45500	

STATE DUMPY VARIABLE IS RELEVANT, STATE IS: KENTUCKY

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-.554	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	.626	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.447	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-.162	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	6.994	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	7.251	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0425	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	277169.660	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	331759.203	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.1970	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-21943.782	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	11090.246	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	3240.971	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-9783.687	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-39545.144	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 39

UTILITY NAME: EASTERN KENTUCKY RURAL ELECTRIC CO.

CITY NAME: LEXINGTON

(FEA REGION 4)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	38.10	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	42.74	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	2.19	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	4.02	\$/MILLION BTU
1975 FAMILY INCOME	12,061.25	\$/YEAR	PROJECTED 1985 FAMILY INCOME	15,919.07	\$/YEAR
1975 HEATING DEGREE DAYS	2,492		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	2,627	
1975 NUMBER OF CUSTOMERS	206560		PROJECTED 1985 NUMBER OF CUSTOMERS	230300	

STATE DUMMY VARIABLE IS RELEVANT, STATE IS: KENTUCKY

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-583	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	723	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	470	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-119	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	7.357	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	7.615	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0623	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	151,961.428	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	179,987.0437	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.1844	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-119,050.094	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	62,167.149	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	17,583.019	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-5,329.073	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-21,388.919	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 40

UTILITY NAME: HENDERSON MUNICIPAL LIGHT DEPT.

CITY NAME: OWENSBORO

(FEA REGION 4)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	37.92	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	42.53	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.41	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	2.66	\$/MILLION BTU
1975 FAMILY INCOME	10955.04	\$/YEAR	PROJECTED 1985 FAMILY INCOME	14046.35	\$/YEAR
1975 HEATING DEGREE DAYS	2380	DAYS	EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	2569	DAYS
1975 NUMBER OF CUSTOMERS	6238		PROJECTED 1985 NUMBER OF CUSTOMERS	9500	

STATE DUMPY VARIABLE IS RELEVANT, STATE IS: KENTUCKY

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-0.554	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	.626	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.447	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-0.162	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	6.994	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	7.291	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0425	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	57616.081	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	69268.409	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.2022	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-4581.669	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	2315.546	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	676.686	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-2042.746	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-8256.676	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 41

UTILITY NAME: KENTUCKY POWER COMPANY

CITY NAME: CHARLESTON

(FEA REGION 3)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

	1975 ELECTRICITY PRICE 1975 NATURAL GAS PRICE 1975 FAMILY INCOME 1975 HEATING DEGREE DAYS 1975 NUMBER OF CUSTOMERS	36.45 2.03 10568.15 2509. 106406	\$/THOUSAND KWH \$/MILLION BTU \$/YEAR \$/YEAR NUMBER OF CUSTOMERS	PROJECTED 1985 ELECTRICITY PRICE PROJECTED 1985 NATURAL GAS PRICE PROJECTED 1985 FAMILY INCOME PROJECTED (AVERAGE) 1985 HEATING DEGREE DAYS PROJECTED 1985 NUMBER OF CUSTOMERS	37.88 3.30 13670.85 107900	\$/THOUSAND KWH \$/MILLION BTU \$/YEAR \$/YEAR NUMBER OF CUSTOMERS
STATE DUMMY VARIABLE IS NOT RELEVANT						

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

	CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	THOUSAND KWH
NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.					

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

	1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY 1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	9.614 10.020 1.1116	THOUSAND KWH THOUSAND KWH	1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA 1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	959086.811 1081149.186 1.1273	THOUSAND KWH THOUSAND KWH
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TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA

	WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT WHEN INCOME IS RAISED BY 10 PERCENT WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-71510.614 36141.033 10561.709 -31834.856 -128970.061	THOUSAND KWH THOUSAND KWH THOUSAND KWH THOUSAND KWH THOUSAND KWH
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NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 42

UTILITY NAME: KENTUCKY UTILITIES CO.

CITY NAME: LEXINGTON

(FEA REGION 4)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

	1975 ELECTRICITY PRICE 2.19 \$/THOUSAND KWH	1975 NATURAL GAS PRICE 12001.25 \$/MILLION BTU	1975 FAMILY INCOME 2492 \$/YEAR	1975 HEATING DEGREE DAYS 251573	1975 NUMBER OF CUSTOMERS 251573	PROJECTED 1985 ELECTRICITY PRICE 42.74 \$/THOUSAND KWH	PROJECTED 1985 NATURAL GAS PRICE 4.02 \$/MILLION BTU	PROJECTED 1985 FAMILY INCOME 16497.27 \$/YEAR	PROJECTED 1985 HEATING DEGREE DAYS 2627	PROJECTED 1985 NUMBER OF CUSTOMERS 292300
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STATE DUMMY VARIABLE IS RELEVANT, STATE IS: KENTUCKY

MONEYARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

	CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	THOUSAND KWH
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NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

	1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	THOUSAND KWH
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TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

	WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	WHEN INCOME IS RAISED BY 10 PERCENT	WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	THOUSAND KWH
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NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 43

UTILITY NAME: LOUISVILLE GAS AND ELECTRIC CO.

CITY NAME: LOUISVILLE (FLA REGION 4)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	30.27	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	33.95	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.32	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	2.41	\$/MILLION BTU
1975 FAMILY INCOME	12346.42	\$/YEAR	PROJECTED 1985 FAMILY INCOME	17840.85	\$/YEAR
1975 HEATING DEGREE DAYS	2249.		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	2578.	
1975 NUMBER OF CUSTOMERS	251708		PROJECTED 1985 NUMBER OF CUSTOMERS	302200	

STATE DUMMY VARIABLE IS RELEVANT, STATE IS: KENTUCKY

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-0.676	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	1.136	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	-0.545	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-0.347	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	8.534	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	9.105	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0670	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	2147951.213	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	2751524.925	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.2810	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-181996.045	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	91979.626	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	26879.776	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-61199.179	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-327843.524	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 44

UTILITY NAME: OWENSBORO MUNICIPAL UTILITIES
CITY NAME: OWENSBORO (FEA REGION 4)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	37.92	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	42.53	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.45	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	2.66	\$/MILLION BTU
1975 FAMILY INCOME	10955.04	\$/YEAR	PROJECTED 1985 FAMILY INCOME	14046.35	\$/YEAR
1975 HEATING DEGREE DAYS	2380	DAYS	PROJECTED 1985 HEATING DEGREE DAYS	2569	DAYS
1975 NUMBER OF CUSTOMERS	18389		PROJECTED 1985 NUMBER OF CUSTOMERS	21100	

STATE DUMPY VARIABLE IS RELEVANT, STATE IS: KENTUCKY

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-.554	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	.626	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.447	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-.162	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	6.994	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	7.291	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0425	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	128611.571	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	153648.773	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.1962	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:		
WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-10176.127	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	5142.949	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	1502.956	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-4537.950	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-18338.517	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 45

UTILITY NAME: BALTIMORE GAS AND ELECTRIC CO.

CITY NAME: BALTIMORE

(FEA REGION 3)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	50.52	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	52.51	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	2.66	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	4.37	\$/MILLION BTU
1975 FAMILY INCOME	12559.00	\$/YEAR	PROJECTED 1985 FAMILY INCOME	17735.34	\$/YEAR
1975 HEATING DEGREE DAYS	2334.		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	2627.	
1975 NUMBER OF CUSTOMERS	691573		PROJECTED 1985 NUMBER OF CUSTOMERS	730100	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A REAL PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-.214	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	.990	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.399	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-.279	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	7.626	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	8.692	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.1104	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	5413669.325	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	6346293.726	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.1723	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-419767.361	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	212147.714	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	61997.242	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-187920.491	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-754138.245	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 46

UTILITY NAME: THE POTOMAC EDISON CO.

CITY NAME: ROANOKE

(FEA REGION 3)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	36.46	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	37.90	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	2.05	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	3.34	\$/MILLION BTU
1975 FAMILY INCOME	1148.92	\$/YEAR	PROJECTED 1985 FAMILY INCOME	15974.03	\$/YEAR
1975 HEATING DEGREE DAYS	2252		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	2393	
1975 NUMBER OF CUSTOMERS	224277		PROJECTED 1985 NUMBER OF CUSTOMERS	252800	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURFOGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-0.253	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	1.219	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	-0.471	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-0.167	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	9.229	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	10.487	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.1363	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	2069802.464	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	2651122.273	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.2809	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-172355.042	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	88623.306	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	25898.938	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-70821.271	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-316889.791	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 47

UTILITY NAME: MONTAUP ELECTRIC COMPANY

CITY NAME: FALL RIVER

(FEA REGION 1)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

	1975 ELECTRICITY PRICE	52.76	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	48.51	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	3.62	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	4.63	\$/MILLION BTU	
1975 FAMILY INCOME	9215.34	\$/YEAR	PROJECTED 1985 FAMILY INCOME	13483.46	\$/YEAR	
1975 HEATING DEGREE DAYS	3416		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	3317		
1975 NUMBER OF CUSTOMERS	194021		PROJECTED 1985 NUMBER OF CUSTOMERS	220600		

STATE DUMMY VARIABLE IS RELEVANT, STATE IS: MASSACHUSETTS

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

	CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	.279	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME <td>.631</td> <td>THOUSAND KWH</td>	.631	THOUSAND KWH	
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE <td>.115</td> <td>THOUSAND KWH</td>	.115	THOUSAND KWH	
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS <td>-.087</td> <td>THOUSAND KWH</td>	-.087	THOUSAND KWH	

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

	1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	4.498	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	5.478	THOUSAND KWH	
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.2179		
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	872761.347	THOUSAND KWH	
1985 PREDICTED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1208912.343	THOUSAND KWH	
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.3847		

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

	1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	872761.347	THOUSAND KWH
WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-79935.480	THOUSAND KWH	
WHEN INCOME IS RAISED BY 10 PERCENT	40398.876	THOUSAND KWH	
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	11806.014	THOUSAND KWH	
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-35330.549	THOUSAND KWH	
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-126353.108	THOUSAND KWH	

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 48

UTILITY NAME: NEW ENGLAND ELECT. SYSTEM CONSOL.

CITY NAME: PROVIDENCE (FEA REGION 1)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	49.95	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	45.93	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	4.14	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	5.29	\$/MILLION BTU
1975 FAMILY INCOME	10262.59	\$/YEAR	PROJECTED 1985 FAMILY INCOME	15015.74	\$/YEAR
1975 HEATING DEGREE DAYS	3118.		PROJECTED (AVERAGE) 1985 HEATING DEGREE DAYS	3317.	
1975 NUMBER OF CUSTOMERS	892719		PROJECTED 1985 NUMBER OF CUSTOMERS	1015000	

STATE DUPPY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	.355	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME PRICE	.802	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.146	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-.111	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	5.713	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	6.957	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.2179	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	5099975.702	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	7061845.118	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.3847	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-467096.579	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	236067.595	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	68987.497	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-206451.237	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-738334.270	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 49

UTILITY NAME: CONSUMERS POWER COMPANY

CITY NAME: FLINT

(FEA REGION 5)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	42.72	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	47.27	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.97	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	3.46	\$/MILLION BTU
1975 FAMILY INCOME	12871.00	\$/YEAR	PROJECTED 1985 FAMILY INCOME	18501.90	\$/YEAR
1975 HEATING DEGREE DAYS	3579.		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	3911.	
1975 NUMBER OF CUSTOMERS	1080605		PROJECTED 1985 NUMBER OF CUSTOMERS	1158100	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A REAL PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-0.479	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	.913	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.404	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-0.180	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	6.847	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	7.441	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0868	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	7348998.240	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	8617778.530	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.1647	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-570011.775	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	268080.271	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	84187.593	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-226015.199	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-663674.314	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 50

UTILITY NAME: THE DETROIT EDISON COMPANY

CITY NAME: CLEVELAND

(FEA REGION 5)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

	1975 ELECTRICITY PRICE	22.41	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	24.80	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.73	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	3.04	\$/MILLION BTU	
1975 FAMILY INCOME	13244.00	\$/YEAR	PROJECTED 1985 FAMILY INCOME	18608.91	\$/YEAR	
1975 HEATING DEGREE DAYS	3271		PROJECTED (AVERAGE) 1985 HEATING DEGREE DAYS	3419		
1975 NUMBER OF CUSTOMERS	1533689		PROJECTED 1985 NUMBER OF CUSTOMERS	1768900		

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A REAL

PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-0.871	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME PRICE <td>1.548</td> <td>THOUSAND KWH</td>	1.548	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE <td>-0.734</td> <td>THOUSAND KWH</td>	-0.734	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS <td>-0.172</td> <td>THOUSAND KWH</td>	-0.172	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

	1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	12.435	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	13.581	THOUSAND KWH	
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0921		
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	19071668.891	THOUSAND KWH	
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	24022685.038	THOUSAND KWH	
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.2596		

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-1588949.320	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	803044.727	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	234678.739	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-694141.249	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-2422903.604	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 51

UTILITY NAME: LANSING BOARD OF WATER AND LIGHT

CITY NAME: FLINT

(FEA REGION 5)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

	1975 ELECTRICITY PRICE	42.72	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	47.27	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.97	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	3.46	\$/MILLION BTU	
1975 FAMILY INCOME	12371.00	\$/YEAR	PROJECTED 1985 FAMILY INCOME	18202.99	\$/YEAR	
1975 HEATING DEGREE DAYS	2579.		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	3911.		
1975 NUMBER OF CUSTOMERS	63687		PROJECTED 1985 NUMBER OF CUSTOMERS	73600		

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A REAL

PRICE INDEX

DEMAND COMPONENT ANALYSIS

	CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-.479	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME <td>.870 <td>THOUSAND KWH</td> </td>	.870 <td>THOUSAND KWH</td>	THOUSAND KWH	
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE <td>.404 <td>THOUSAND KWH</td> </td>	.404 <td>THOUSAND KWH</td>	THOUSAND KWH	
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS <td>-.180 <td>THOUSAND KWH</td> </td>	-.180 <td>THOUSAND KWH</td>	THOUSAND KWH	

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

	1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	6.847	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY <td>7.400 <td>THOUSAND KWH</td> </td>	7.400 <td>THOUSAND KWH</td>	THOUSAND KWH	
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY <td>1.0807</td> <td></td>	1.0807		
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	437439.953 <td>THOUSAND KWH</td>	THOUSAND KWH	
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	544611.247 <td>THOUSAND KWH</td>	THOUSAND KWH	
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.2450		

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

	WHEN ELECTRICITY PRICE IS PAID BY 10 PERCENT	-36022.611	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT <td>18235.595 <td>THOUSAND KWH</td> </td>	18235.595 <td>THOUSAND KWH</td>	THOUSAND KWH	
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT <td>5320.334 <td>THOUSAND KWH</td> </td>	5320.334 <td>THOUSAND KWH</td>	THOUSAND KWH	
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT <td>-14283.319 <td>THOUSAND KWH</td> </td>	-14283.319 <td>THOUSAND KWH</td>	THOUSAND KWH	
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT <td>-41954.372 <td>THOUSAND KWH</td> </td>	-41954.372 <td>THOUSAND KWH</td>	THOUSAND KWH	

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

UTILITY NAME: UPPER PENINSULA POWER COMPANY

CITY NAME: FLINT

(F&A REGION 5)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

	1975 ELECTRICITY PRICE	42.72	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	47.27	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.97	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	3.46	\$/MILLION BTU	
1975 FAMILY INCOME	12871.00	\$/YEAR	PROJECTED 1985 FAMILY INCOME	17871.62	\$/YEAR	
1975 HEATING DEGREE DAYS	3479.		PROJECTED 1985 HEATING DEGREE DAYS	3911.		
1975 NUMBER OF CUSTOMERS	36164		PROJECTED 1985 NUMBER OF CUSTOMERS	37300		

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A REAL

PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-.479	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME <td>.821 <th>THOUSAND KWH</th> </td>	.821 <th>THOUSAND KWH</th>	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE <td>.404 <th>THOUSAND KWH</th> </td>	.404 <th>THOUSAND KWH</th>	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS <td>-.180 <th>THOUSAND KWH</th> </td>	-.180 <th>THOUSAND KWH</th>	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	6.847	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY <th>7.353</th> <th>THOUSAND KWH</th>	7.353	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY <th>1.0739</th> <th></th>	1.0739	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA <th>247618.114</th> <th>THOUSAND KWH</th>	247618.114	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA <th>274262.656</th> <th>THOUSAND KWH</th>	274262.656	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA <th>1.1076</th> <th></th>	1.1076	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-18140.747	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	9168.217	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	2679.265	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-7192.982	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-21127.943	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 53

UTILITY NAME: MINNESOTA POWER AND LIGHT CO.

CITY NAME: DULUTH

(FEA REGION 5)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

	1975 ELECTRICITY PRICE \$ / THOUSAND KWH	43.96	1975 NATURAL GAS PRICE \$/ MILLION BTU	2.13	1975 FAMILY INCOME \$/ YEAR	10420.13	1975 HEATING DEGREE DAYS DEGREE DAYS	5575	1975 NUMBER OF CUSTOMERS	81406	PROJECTED 1985 ELECTRICITY PRICE \$/ THOUSAND KWH	48.64	PROJECTED 1985 NATURAL GAS PRICE \$/ MILLION BTU	3.70	PROJECTED 1985 FAMILY INCOME \$/ YEAR	14912.25	EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS DEGREE DAYS	5419	PROJECTED 1985 NUMBER OF CUSTOMERS	90700
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STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

	CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	- .440	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME <td>.826</td> <td>THOUSAND KWH</td>	.826	THOUSAND KWH	
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE <td>.370</td> <td>THOUSAND KWH</td>	.370	THOUSAND KWH	
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS <td>.020</td> <td>THOUSAND KWH</td>	.020	THOUSAND KWH	

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

	1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	6.276	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	7.017	THOUSAND KWH	
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.1180		
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	510944.566	THOUSAND KWH	
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	636432.736	THOUSAND KWH	
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.2456		

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

	WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-42096.017	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	21275.055	THOUSAND KWH	
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	6217.341	THOUSAND KWH	
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-4597.907	THOUSAND KWH	
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	42713.497	THOUSAND KWH	

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 54

UTILITY NAME: NORTHERN STATES POWER COMPANY

CITY NAME: MINNEAPOLIS

(FEA REGION 5)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	39.62	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	43.84	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.57	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	2.75	\$/MILLION BTU
1975 FAMILY INCOME	13450.00	\$/YEAR	PROJECTED 1985 FAMILY INCOME	16980.77	\$/YEAR
1975 HEATING DEGREE DAYS	4484		PROJECTED (AVERAGE) 1985 HEATING DEGREE DAYS	4532	
1975 NUMBER OF CUSTOMERS	783599		PROJECTED 1985 NUMBER OF CUSTOMERS	857400	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A REAL

PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-507	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME PRICE	.914	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.427	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-5019	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	7.240	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	8.009	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.1062	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	5673196.862	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	6866935.793	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.2104	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-454204.555	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	229552.045	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	67083.418	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-140089.686	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-218046.011	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 55

UTILITY NAME: NORTHERN STATES POWER COMPANY

CITY NAME: FARGO

(FEA REGION 5)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	40.08	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	44.34	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	2.98	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	5.23	\$/MILLION BTU
1975 FAMILY INCOME	11182.43	\$/YEAR	PROJECTED 1985 FAMILY INCOME	15780.75	\$/YEAR
1975 HEATING DEGREE DAYS	5105		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	5150	
1975 NUMBER OF CUSTOMERS	763599		PROJECTED 1985 NUMBER OF CUSTOMERS	857400	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-508	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	.915	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.428	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-.011	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	7.248	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	8.026	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.1075	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	5679141.242	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	6881856.182	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.2118	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-455191.444	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	230050.817	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	67229.176	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-81437.845	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	223006.698	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

UTILITY NAME: NORTHERN STATES POWER COMPANY

CITY NAME: SIOUX FALLS (FEA REGION 5)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	40.39	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	44.69	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.80	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	3.15	\$/MILLION BTU
1975 FAMILY INCOME	10942.82	\$/YEAR	PROJECTED 1985 FAMILY INCOME	15442.61	\$/YEAR
1975 HEATING DEGREE DAYS	4419.		EXPECTED 1985 HEATING DEGREE DAYS	4354.	
1975 NUMBER OF CUSTOMERS	783599		PROJECTED 1985 NUMBER OF CUSTOMERS	857400	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-0.485	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	.874	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.409	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	.026	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	6.929	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	7.714	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.1133	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	5429396.694	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	6613947.447	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.2182	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-437472.969	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	221097.003	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	64611.963	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-147642.417	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-308050.477	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 57

UTILITY NAME: OTTER TAIL POWER COMPANY

CITY NAME: FARGO

(FEA REGION B)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	40.68	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	47.78	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	2.98	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	6.94	\$/MILLION BTU
1975 FAMILY INCOME	11182.43	\$/YEAR	PROJECTED 1985 FAMILY INCOME	15592.60	\$/YEAR
1975 HEATING DEGREE DAYS	195		PROJECTED (AVERAGE) 1985 HEATING DEGREE DAYS	5150	
1975 NUMBER OF CUSTOMERS	86895		PROJECTED 1985 NUMBER OF CUSTOMERS	94900	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-.859	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.881	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-.011	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	7.248	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	7.798	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0760	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	625772.343	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	740045.899	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.1751	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-48949.375	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	24738.898	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	-7229.543	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-8757.484	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	23981.203	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

UTILITY NAME: UNITED POWER ASSOCIATION

CITY NAME: DULUTH

(FFA REGION 5)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	43.96	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	48.64	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	2.11	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	3.70	\$/MILLION BTU
1975 FAMILY INCOME	10423.13	\$/YEAR	PROJECTED 1985 FAMILY INCOME	14947.33	\$/YEAR
1975 HEATING DEGREE DAYS	575		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	5419	
1975 NUMBER OF CUSTOMERS	135826		PROJECTED 1985 NUMBER OF CUSTOMERS	154200	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-0.440	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	.832	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.370	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	.020	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	6.276	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	7.023	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.1189	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	852511.567	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	1082883.184	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.2702	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-71625.903	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	36199.269	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	10578.737	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-7823.288	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	72676.538	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 59

UTILITY NAME: MISSISSIPPI POWER COMPANY

CITY NAME: JACKSON

(FEA REGION 4)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	38.13	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	42.77	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.77	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	3.24	\$/MILLION BTU
1975 FAMILY INCOME	10186.60	\$/YEAR	PROJECTED 1985 FAMILY INCOME	13932.20	\$/YEAR
1975 HEATING DEGREE DAYS	1189.		PROJECTED (AVERAGE) 1985 HEATING DEGREE DAYS	1278.	
1975 NUMBER OF CUSTOMERS	124076		PROJECTED 1985 NUMBER OF CUSTOMERS	127300	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-0.859	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	1.237	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.693	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-0.160	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	10.847	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	11.663	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0752	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1345822.632	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	1484680.793	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.1032	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-98202.284	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	49630.800	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	14303.916	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-30692.680	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-1399513.126	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 60

UTILITY NAME: KANSAS CITY POWER AND LIGHT CO.

CITY NAME: KANSAS CITY (FEA REGION 7)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	42.05	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	46.95	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.22	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	2.38	\$/MILLION BTU
1975 FAMILY INCOME	12853.00	\$/YEAR	PROJECTED 1985 FAMILY INCOME	17956.15	\$/YEAR
1975 HEATING DEGREE DAYS	2923		PROJECTED 1985 HEATING DEGREE DAYS	2867	
1975 NUMBER OF CUSTOMERS	281708		PROJECTED 1985 NUMBER OF CUSTOMERS	314500	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A REAL

PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-.580	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	.533	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.539	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	.072	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	7.628	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	8.649	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.1207	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	2148937.595	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	2688740.981	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.2512	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-177843.282	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	89880.847	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	26266.437	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-80284.261	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-311759.234	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

UTILITY NAME: MISSOURI PUBLIC SERVICE COMPANY

CITY NAME: COLUMBIA

(FEA REGION 4)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	38.96	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	43.71	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	2.44	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	4.48	\$/MILLION BTU
1975 FAMILY INCOME	11723.42	\$/YEAR	PROJECTED 1985 FAMILY INCOME	16378.09	\$/YEAR
1975 HEATING DEGREE DAYS	2884.		PROJECTED (AVERAGE) 1985 HEATING DEGREE DAYS	2803.	
1975 NUMBER OF CUSTOMERS	100272		PROJECTED 1985 NUMBER OF CUSTOMERS	111900	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-0.669	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	1.032	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	.077	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	8.444	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	9.367	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.1093	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	846684.165	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1048184.642	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.2380	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-69330.813	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	35039.345	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	-10239.765	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-31270.238	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-122567.876	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

UTILITY NAME: ASSOCIATED ELECTRIC COOP. INC.

CITY NAME: COLUMBIA

(FEA REGION 4)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	38.96	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	43.71	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	2.44	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	4.48	\$/MILLION BTU
1975 FAMILY INCOME	11725.42	\$/YEAR	PROJECTED 1985 FAMILY INCOME	16289.78	\$/YEAR
1975 HEATING DEGREE DAYS	2884.		PROJECTED 1985 HEATING DEGREE DAYS	2803.	
1975 NUMBER OF CUSTOMERS	6951		PROJECTED 1985 NUMBER OF CUSTOMERS	7100	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-1.669	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	1.045	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	.077	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	8.444	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	9.350	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.1073	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	58694.064	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	66382.864	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.1310	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-4390.808	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	2219.086	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	648.497	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-1980.384	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-7762.379	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 63

UTILITY NAME: COLUMBIA WATER AND LIGHT DEPT.

CITY NAME: COLUMBIA

(FEA REGION 4)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	38.96	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	43.71	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	2.44	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	4.48	\$/MILLION BTU
1975 FAMILY INCOME	1723.42	\$/YEAR	PROJECTED 1985 FAMILY INCOME	16858.16	\$/YEAR
1975 HEATING DEGREE DAYS	2884		PROJECTED 1985 HEATING DEGREE DAYS	17700	
1975 NUMBER OF CUSTOMERS	16754		PROJECTED 1985 NUMBER OF CUSTOMERS	17700	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-0.669	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	1.127	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.539	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	.077	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	8.444	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	9.461	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.1204	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	141470.341	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	167459.525	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.1837	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-11076.393	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	5597.937	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	1635.920	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-4995.779	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-19581.625	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 64

UTILITY NAME: INDEPENDENCE POWER AND LIGHT CO.

CITY NAME: KANSAS CITY (FEA REGION 7)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	42.05	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	46.95	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.22	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	2.38	\$/MILLION BTU
1975 FAMILY INCOME	12853.36	\$/YEAR	PROJECTED 1985 FAMILY INCOME	17958.15	\$/YEAR
1975 HEATING DEGREE DAYS	2953.		PROJECTED 1985 HEATING DEGREE DAYS	2867.	
1975 NUMBER OF CUSTOMERS	38637		PROJECTED 1985 NUMBER OF CUSTOMERS	43100	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A REAL PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-.580	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	.933	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.539	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	.072	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	7.628	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	8.549	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.1207	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	284732.496	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	368472.929	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.2502	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-24372.164	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	12317.534	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	3599.629	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-41922.399	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 65

UTILITY NAME: ST JOSEPH LIGHT AND POWER CO.

CITY NAME: COLUMBIA

(FEA REGION 4)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	36.96	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	43.71	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	2.44	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	4.48	\$/MILLION BTU
1975 FAMILY INCOME	11723.42	\$/YEAR	PROJECTED 1985 FAMILY INCOME	16378.09	\$/YEAR
1975 HEATING DEGREE DAYS	2864.		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	2803.	
1975 NUMBER OF CUSTOMERS	4660		PROJECTED 1985 NUMBER OF CUSTOMERS	5230	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONEY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-0.669	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	1.032	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.539	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	.077	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	8.444	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	9.367	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.1093	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	395664.624	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	489902.205	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.2381	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-32403.945	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	16376.745	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	4785.678	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-14615.132	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-57285.970	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

UTILITY NAME: UNION ELECTRIC COMPANY

CITY NAME: ST LOUIS

(FEA REGION 7)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	39.00	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	43.54	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.92	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	3.75	\$/MILLION BTU
1975 FAMILY INCOME	12824.00	\$/YEAR	PROJECTED 1985 FAMILY INCOME	18152.06	\$/YEAR
1975 HEATING DEGREE DAYS	2695.		EXPECTED 1985 HEATING DEGREE DAYS	2639.	
1975 NUMBER OF CUSTOMERS	669250		PROJECTED 1985 NUMBER OF CUSTOMERS	736300	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A REAL

PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985	CHANGE IN ELECTRICITY PRICE	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985	1.161	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985	.645	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985	.660	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	9.119	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	10.238	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.1227	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	6102861.635	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	7537875.112	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.2351	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-498582.965	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	251990.611	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	-73637.856	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-223370.526	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-895042.616	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 67

UTILITY NAME: SPRINGFIELD (MO) CITY UTILITIES

CITY NAME: COLUMBIA (FEA REGION 4)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	38.96	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	43.71	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	2.44	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	4.48	\$/MILLION BTU
1975 FAMILY INCOME	11723.42	\$/YEAR	PROJECTED 1985 FAMILY INCOME	16289.78	\$/YEAR
1975 HEATING DEGREE DAYS	2884		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	2803	
1975 NUMBER OF CUSTOMERS	46327		PROJECTED 1985 NUMBER OF CUSTOMERS	47200	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-1.669	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	1.015	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	0.935	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	0.077	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	8.444	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	9.350	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.1073	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	391183.986	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	441305.749	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.1281	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-29189.599	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	14752.235	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	4311.137	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-13165.368	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS PAISED BY 50 PERCENT	-51603.423	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 68

UTILITY NAME: MONTANA POWER COMPANY

CITY NAME: BILLINGS

(FEA REGION 8)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	28.64	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	34.15	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.08	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	2.52	\$/MILLION BTU
1975 FAMILY INCOME	10686.53	\$/YEAR	PROJECTED 1985 FAMILY INCOME	14614.00	\$/YEAR
1975 HEATING DEGREE DAYS	4368		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	4036	
1975 NUMBER OF CUSTOMERS	169510		PROJECTED 1985 NUMBER OF CUSTOMERS	152700	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-.628	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	.797	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.629	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	.152	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	6.986	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	7.642	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0936	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1184577.178	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	1166969.423	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	.9851	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-77187.678	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	39610.154	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	11400.179	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-29695.626	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-80913.221	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 69

UTILITY NAME: MONTANA POWER COMPANY

CITY NAME: GREAT FALLS

(FEA REGION 8)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	28.64	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	34.15	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.89	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	4.39	\$/MILLION BTU
1975 FAMILY INCOME	10669.85	\$/YEAR	PROJECTED 1985 FAMILY INCOME	14591.18	\$/YEAR
1975 HEATING DEGREE DAYS	4756		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	4251	
1975 NUMBER OF CUSTOMERS	169510		PROJECTED 1985 NUMBER OF CUSTOMERS	152700	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-.902	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	.867	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.685	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	.211	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	7.607	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	8.368	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.1001	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1269382.484	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	1277783.332	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	.9910	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-84517.320	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	42714.528	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	12482.725	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-29873.155	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-69588.029	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 70

UTILITY NAME: NEBRASKA PUBLIC POWER DISTRICT

CITY NAME: LINCOLN

(FLEA REGION 7)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	27.55	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	30.76	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.73	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	3.37	\$/MILLION BTU
1975 FAMILY INCOME	11624.03	\$/YEAR	PROJECTED 1985 FAMILY INCOME	14771.39	\$/YEAR
1975 HEATING DEGREE DAYS	3641	DAYS	EXPECTED (AVERAGE) 1985 HEATING DEGREE	3454	DAYS
1975 NUMBER OF CUSTOMERS	73354		PROJECTED 1985 NUMBER OF CUSTOMERS	73300	

STATE DUMPHY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-.749	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME PRICE	.849	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.696	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	.162	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	9.853	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	10.761	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0922	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	742441.217	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	768812.673	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.0625	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-52174.990	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	26368.903	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	7705.948	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-22087.722	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-78482.556	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 71

UTILITY NAME: OMAHA PUBLIC POWER DISTRICT

CITY NAME: OMAHA

(FEA REGION 7)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	32.33	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	36.09	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.17	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	2.28	\$/MILLION BTU
1975 FAMILY INCOME	12103.70	\$/YEAR	PROJECTED 1985 FAMILY INCOME	17068.47	\$/YEAR
1975 HEATING DEGREE DAYS	3452.		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	3360.	
1975 NUMBER OF CUSTOMERS	171239		PROJECTED 1985 NUMBER OF CUSTOMERS	177700	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-658	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME <td>1.090</td> <th>THOUSAND KWH</th>	1.090	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE <td>.612</td> <th>THOUSAND KWH</th>	.612	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS <td>.074</td> <th>THOUSAND KWH</th>	.074	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	8.653	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	9.720	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.1234	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1461693.442	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	1727270.462	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.1657	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-114248.063	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	57740.233	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	16873.786	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-52264.518	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-177988.936	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

UTILITY NAME: NEVADA POWER COMPANY

CITY NAME: PHOENIX

(FLA REGION 9)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	39.68	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	45.77	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	11875.95	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	2.02	\$/MILLION BTU
1975 FAMILY INCOME	11875.38	\$/YEAR	PROJECTED 1985 FAMILY INCOME	19144.55	\$/YEAR
1975 HEATING DEGREE DAYS	820.		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	862.	
1975 NUMBER OF CUSTOMERS	110185		PROJECTED 1985 NUMBER OF CUSTOMERS	124400	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-1.252	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	2.364	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	1.033	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-0.097	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	12.663	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	14.679	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.1411	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1417348.566	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	1826023.793	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.2883	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-120779.974	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	61041.419	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	17838.512	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-27649.626	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-130728.873	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 73

UTILITY NAME: PUBLIC SERVICE CO. OF NEW HAMPSHIRE

CITY NAME: MANCHESTER (FEA REGION 1)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	49.78	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	45.77	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	2.76	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	3.56	\$/MILLION BTU
1975 FAMILY INCOME	10464.82	\$/YEAR	PROJECTED 1985 FAMILY INCOME	12357.99	\$/YEAR
1975 HEATING DEGREE DAYS	4205		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	4088	
1975 NUMBER OF CUSTOMERS	225296		PROJECTED 1985 NUMBER OF CUSTOMERS	254600	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	.404	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	.920	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.166	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	.051	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	6.498	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	8.142	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.2530	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1464015.102	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	2074862.933	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.4171	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-137225.887	THOUSAND KWH
WHEN INCOME IS RAISED BY 1% PERCENT	69353.077	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	20267.460	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-51549.115	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-136786.026	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

UTILITY NAME: PUBLIC SERVICE CO. OF NEW HAMPSHIRE

CITY NAME: NASHUA (FEA REGION 1)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	49.76	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	45.77	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	2.36	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	3.02	\$/MILLION BTU
1975 FAMILY INCOME	11738.25	\$/YEAR	PROJECTED 1985 FAMILY INCOME	17226.85	\$/YEAR
1975 HEATING DEGREE DAYS	4235		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	4089	
1975 NUMBER OF CUSTOMERS	225296		PROJECTED 1985 NUMBER OF CUSTOMERS	254800	

STATE DUMPY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	.413	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	.941	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.169	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	.052	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	6.647	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	8.326	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.2530	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1497446.678	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	2122037.533	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	1.4171	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-140359.418	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	70936.744	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	20736.284	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-52726.231	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-139909.516	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 75

UTILITY NAME: ATLANTIC CITY ELECTRIC CO.

CITY NAME: ATLANTIC CITY (FEA REGION 2)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	54.90	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	49.06	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	2.21	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	3.12	\$/MILLION BTU
1975 FAMILY INCOME	19256.80	\$/YEAR	PROJECTED 1985 FAMILY INCOME	20690.84	\$/YEAR
1975 HEATING DEGREE DAYS	2714.		PROJECTED 1985 HEATING DEGREE DAYS	2748.	
1975 NUMBER OF CUSTOMERS	276254		PROJECTED 1985 NUMBER OF CUSTOMERS	308300	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	.572	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	1.819	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.243	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-.027	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	6.790	THOUSAND KWH
1985 PROJECTED ELECTRICITY CONSUMPTION PER FAMILY	9.675	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.4249	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1875811.464	THOUSAND KWH
1985 PROJECTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	2982902.122	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	1.5902	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-197300.169	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	99714.242	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	29140.111	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-88851.252	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-350948.623	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 76

UTILITY NAME: PUBLIC SERVICE ELECTRIC AND GAS (NJ)

CITY NAME: NEWARK

(FEA REGION 2)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

	1975 ELECTRICITY PRICE	56.19	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	50.20	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	2.38	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	3.36	\$/MILLION BTU	
1975 FAMILY INCOME	12245.00	\$/YEAR	PROJECTED 1985 FAMILY INCOME	21505.14	\$/YEAR	
1975 HEATING DEGREE DAYS	2585		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	2796		
1975 NUMBER OF CUSTOMERS	1461202		PROJECTED 1985 NUMBER OF CUSTOMERS	1679900		

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A REAL

PRICE INDEX

DEMAND COMPONENT ANALYSIS

	CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	0.566	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME PRICE <td>1.442</td> <td>THOUSAND KWH</td>	1.442	THOUSAND KWH	
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE <td>.241</td> <td>THOUSAND KWH</td>	.241	THOUSAND KWH	
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS <td>-.164</td> <td>THOUSAND KWH</td>	-.164	THOUSAND KWH	

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

	1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	6.724	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	6.947 <td>THOUSAND KWH</td>	THOUSAND KWH	
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.3307		
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	9825131.062	THOUSAND KWH	
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	15030771.611	THOUSAND KWH	
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.5298		

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-994190.878	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	502457.650	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	146836.314	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-448339.247	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-1759074.347	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 77

UTILITY NAME: PUBLIC SERVICE CO. OF NEW MEXICO
CITY NAME: ALBUQUERQUE (FEA REGION 6)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	41.08	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	58.86	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.24	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	3.93	\$/MILLION BTU
1975 FAMILY INCOME	11226.22	\$/YEAR	PROJECTED 1985 FAMILY INCOME	15342.22	\$/YEAR
1975 HEATING DEGREE DAYS	2743		PROJECTED 1985 HEATING DEGREE DAYS	2384	
1975 NUMBER OF CUSTOMERS	146642		PROJECTED 1985 NUMBER OF CUSTOMERS	166900	

STATE DUMMY VARIABLE IS RELEVANT, STATE IS: NEW MEXICO

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-1.281	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	.640	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.421	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	.230	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	5.627	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	5.415	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	.9623	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	837494.415	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	903738.593	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.0791	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-59776.616	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	30210.716	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	8628.665	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-26160.659	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-108611.070	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 78

UTILITY NAME: EL PASO ELECTRIC CO.

CITY NAME: EL PASO

(FEA REGION 6)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	42.86	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	61.41	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.90	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	3.96	\$/MILLION BTU
1975 FAMILY INCOME	9644.67	\$/YEAR	PROJECTED 1985 FAMILY INCOME	13955.43	\$/YEAR
1975 HEATING DEGREE DAYS	1529.		EXPECTED (AVERAGED) 1985 HEATING DEGREE DAYS	1488.	
1975 NUMBER OF CUSTOMERS	138315		PROJECTED 1985 NUMBER OF CUSTOMERS	121200	

STATE DUMMY VARIABLE IS RELEVANT, STATE IS: TEXAS

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-1.347	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.805	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	.443	THOUSAND KWH
NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.	.038	THOUSAND KWH

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	5.919	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	5.618	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	.9491	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	818725.182	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	680895.040	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	.8317	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-45036.919	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	22761.368	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	6651.696	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-15567.640	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-69805.779	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 79

UTILITY NAME: ROCHESTER GAS AND ELECTRIC COOP.

CITY NAME: ROCHESTER (FEA REGION 2)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	39.14	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	34.94	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	2.09	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	2.95	\$/MILLION BTU
1975 FAMILY INCOME	13284.11	\$/YEAR	PROJECTED 1985 FAMILY INCOME	18669.10	\$/YEAR
1975 HEATING DEGREE DAYS	3526		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	3732	
1975 NUMBER OF CUSTOMERS	245812		PROJECTED 1985 NUMBER OF CUSTOMERS	314200	

STATE DUMMY VARIABLE IS RELEVANT, STATE IS: NEW YORK

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	.537	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	.794	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.226	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-.110	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	6.375	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	7.911	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.241	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1566935.397	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	2485729.219	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.5864	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-164415.333	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	83094.448	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	24283.205	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-68098.021	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-215954.771	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 80

UTILITY NAME: NEW YORK STATE ELECT. AND GAS COGP.

CITY NAME: BINGHAMTON (FEA REGION 2)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	34.79	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	31.09	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	2.35	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	3.32	\$/MILLION BTU
1975 FAMILY INCOME	10705.67	\$/YEAR	PROJECTED 1985 FAMILY INCOME	15630.03	\$/YEAR
1975 HEATING DEGREE DAYS	3939		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	4047	
1975 NUMBER OF CUSTOMERS	55622		PROJECTED 1985 NUMBER OF CUSTOMERS	603400	

STATE DUMMY VARIABLE IS RELEVANT, STATE IS: NEW YORK

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	.531	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME PRICE	.879	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.226	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-.053	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	6.303	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	7.998	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.2689	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	3508446.718	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	4826001.231	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.3755	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-319209.587	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	161326.464	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	47145.433	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-181149.624	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-331196.154	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 31

UTILITY NAME: NIAGARA MOHAWK POWER COOPERATION

CITY NAME: BUFFALO

(FEA REGION 2)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	37.49	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	33.50	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.99	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	2.81	\$/MILLION BTU
1975 FAMILY INCOME	11569.00	\$/YEAR	PROJECTED 1985 FAMILY INCOME	16918.05	\$/YEAR
1975 HEATING DEGREE DAYS	3532.		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	3848.	
1975 NUMBER OF CUSTOMERS	1156978		PROJECTED 1985 NUMBER OF CUSTOMERS	1209600	

STATE DUMMY VARIABLE IS RELEVANT, STATE IS: NEW YORK

MONETARY VARIABLES ARE DEFLATED BY A PEAL PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE .528 THOUSAND KWH
 CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME .878 THOUSAND KWH
 CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE .224 THOUSAND KWH
 CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS -.162 THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	6.265	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	7.814	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.2473	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	7248220.470	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	9451645.228	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.3040	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT -251166.805 THOUSAND KWH
 WHEN INCOME IS RAISED BY 10 PERCENT 315955.267 THOUSAND KWH
 WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT 92333.566 THOUSAND KWH
 WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT -252018.173 THOUSAND KWH
 WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT -762334.707 THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 82

UTILITY NAME: CAROLINA POWER AND LIGHT CO.

CITY NAME: RALEIGH

(FEA REGION 4)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	38.11	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	42.75	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	2.06	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	3.77	\$/MILLION BTU
1975 FAMILY INCOME	11623.00	\$/YEAR	PROJECTED 1985 FAMILY INCOME	15670.89	\$/YEAR
1975 HEATING DEGREE DAYS	1639.		PROJECTED 1985 HEATING DEGREE DAYS	1952.	
1975 NUMBER OF CUSTOMERS	554571		PROJECTED 1985 NUMBER OF CUSTOMERS	586800	

STATE DUPHY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A REAL

PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-0.792	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME PRICE	1.089	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	0.638	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-0.161	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	9.995	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	10.675	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0684	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	5542761.326	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	6266145.390	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.1305	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-414466.053	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	209466.467	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	61215.269	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-167551.889	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-721803.838	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 83

 UTILITY NAME: DUKE POWER COMPANY
 CITY NAME: CHARLOTTE

(FEA REGION 4)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	37.23	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	41.76	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	2.51	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	4.61	\$/MILLION BTU
1975 FAMILY INCOME	12187.23	\$/YEAR	PROJECTED 1985 FAMILY INCOME	17111.80	\$/YEAR
1975 HEATING DEGREE DAYS	1666.		PROJECTED 1985 HEATING DEGREE DAYS	1788.	
1975 NUMBER OF CUSTOMERS	961664		PROJECTED 1985 NUMBER OF CUSTOMERS	1122700	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-839	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	1.316	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.676	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-.202	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	10.595	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	11.446	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0803	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	10168541.711	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	12849960.627	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.2612	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-849943.966	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	429556.193	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	125531.869	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-326381.923	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-1435022.513	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 84

UTILITY NAME: MONTANA - DAKOTA UTILITIES CO.

CITY NAME: BILLINGS

(FEA REGION 8)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	28.64	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	34.15	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.08	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	2.52	\$/MILLION BTU
1975 FAMILY INCOME	10686.53	\$/YEAR	PROJECTED 1985 FAMILY INCOME	13916.59	\$/YEAR
1975 HEATING DEGREE DAYS	4369		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	4036	
1975 NUMBER OF CUSTOMERS	74211		PROJECTED 1985 NUMBER OF CUSTOMERS	67200	

STATE DUMPY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-.828	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME PRICE	.667	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.829	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	.152	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	6.988	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	7.514	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0753	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	522797.494	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	504967.234	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	.9659	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-33400.402	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	16880.346	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	4933.649	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-12793.393	THOUSAND KWH
	-35013.373	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 85

UTILITY NAME: BASIN ELECTRIC POWER

CITY NAME: SIOUX FALLS

(FEA REGION 8)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	40.39	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	48.15	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.60	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	4.18	\$/MILLION BTU
1975 FAMILY INCOME	10942.82	\$/YEAR	PROJECTED 1985 FAMILY INCOME	14115.35	\$/YEAR
1975 HEATING DEGREE DAYS	4419.		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	4354.	
1975 NUMBER OF CUSTOMERS	27460		PROJECTED 1985 NUMBER OF CUSTOMERS	25100	

STATE CUPMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-0.821	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	.636	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.624	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	.026	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	6.929	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	7.266	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0530	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	190264.706	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	183127.481	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	.9625	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-12112.730	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	6121.695	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	1798.981	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-4093.472	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-8529.325	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 86

UTILITY NAME: MINNKOTA POWER COOPERATION

CITY NAME: FARGO

(FEA REGION 8)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	40.08	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	47.78	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	2.98	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	6.94	\$/MILLION BTU
1975 FAMILY INCOME	11182.43	\$/YEAR	PROJECTED 1985 FAMILY INCOME	12868.54	\$/YEAR
1975 HEATING DEGREE DAYS	5105		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	5150	
1975 NUMBER OF CUSTOMERS	5466		PROJECTED 1985 NUMBER OF CUSTOMERS	5000	

STATE DUMPY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURFGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-.859	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME PRICE	.364	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.852	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-.011	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	7.248	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	7.302	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0076	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	398368.353	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	365111.894	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	0.9165	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-24169.846	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	12205.176	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	3566.794	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-4329.625	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	11831.456	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 87

UTILITY NAME: THE CINCINNATI GAS AND ELECTRIC CO.

CITY NAME: CINCINNATI (FEA REGION 5)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	39.24	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	43.42	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.89	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	3.31	\$/MILLION BTU
1975 FAMILY INCOME	12668.00	\$/YEAR	PROJECTED 1985 FAMILY INCOME	18401.13	\$/YEAR
1975 HEATING DEGREE DAYS	2489		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	2691	
1975 NUMBER OF CUSTOMERS	405775		PROJECTED 1985 NUMBER OF CUSTOMERS	457500	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A REAL

PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-631	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	1.238	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.531	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-.216	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	9.006	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	9.846	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0933	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	3681241.199	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	4504595.919	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.2237	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-297950.650	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	150582.335	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	44005.609	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-133862.414	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-532793.705	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 88

UTILITY NAME: CLEVELAND ELECTRIC ILLUMINATING CO.

CITY NAME: CLEVELAND (FEA REGION 5)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	22.41	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	24.80	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.73	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	3.04	\$/MILLION BTU
1975 FAMILY INCOME	13244.00	\$/YEAR	PROJECTED 1985 FAMILY INCOME	18823.61	\$/YEAR
1975 HEATING DEGREE DAYS	3271		EXPECTED (AVERAGED) 1985 HEATING DEGREE DAYS	3419	
1975 NUMBER OF CUSTOMERS	625824		PROJECTED 1985 NUMBER OF CUSTOMERS	695200	

STATE DUMPY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A REAL PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-0.671	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	1.605	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	0.734	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-0.172	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	12.435	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	13.636	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0966	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	778221.892	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	947669.777	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.2181	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-627622.437	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	316893.091	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	92607.632	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-273918.200	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-956112.887	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 89

UTILITY NAME: COLUMBUS AND SOUTHERN OHIO ELECT. C

CITY NAME: COLUMBUS

(FEA REGION 5)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	\$0.70	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	56.09	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.80	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	3.16	\$/MILLION BTU
1975 FAMILY INCOME	13329.38	\$/YEAR	PROJECTED 1985 FAMILY INCOME	18933.94	\$/YEAR
1975 HEATING DEGREE DAYS	2936		PROJECTED (AVERAGE) 1985 HEATING DEGREE DAYS	3167	
1975 NUMBER OF CUSTOMERS	381440		PROJECTED 1985 NUMBER OF CUSTOMERS	451200	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-.505	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	.928	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.425	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-.172	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	7.266	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	7.819	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0852	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	2748551.519	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	3528077.537	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.2836	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-233360.109	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	117038.692	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	34465.955	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-104434.844	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-385378.338	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 90

UTILITY NAME: THE DAYTON POWER AND LIGHT CO.

CITY NAME: DAYTON

(FEA REGION 5)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	44.17	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	48.87	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.85	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	3.24	\$/MILLION BTU
1975 FAMILY INCOME	14318.00	\$/YEAR	PROJECTED 1985 FAMILY INCOME	20927.74	\$/YEAR
1975 HEATING DEGREE DAYS	2843		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	3134	
1975 NUMBER OF CUSTOMERS	353694		PROJECTED 1985 NUMBER OF CUSTOMERS	408400	

STATE DUPHY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A REAL PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-1.573	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME PRICE	1.142	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.482	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-.214	THOUSAND KWH

NOTE: OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	8.176	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	8.939	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0932	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	2891967.476	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	3650504.458	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.26223	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-241457.879	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	122031.253	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	35661.956	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-108275.524	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-402074.640	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 91

UTILITY NAME: HAMILTON DEPT. OF PUBLIC UTILITIES

CITY NAME: CINCINNATI (FEA REGION 5)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

	1975 ELECTRICITY PRICE	39.24	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	43.42	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.89	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	3.31	\$/MILLION BTU	
1975 FAMILY INCOME	12666.00	\$/YEAR	PROJECTED 1985 FAMILY INCOME	18401.13	\$/YEAR	
1975 HEATING DEGREE DAYS	2489.		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	2691.		
1975 NUMBER OF CUSTOMERS	19834		PROJECTED 1985 NUMBER OF CUSTOMERS	22200		

STATE DUMMY VARIABLE IS NOT RELEVANT

MONEYARY VARIABLES ARE DEFLATED BY A REAL

PRICE INDEX

DEMAND COMPONENT ANALYSIS

	CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-0.631	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE <td>1.2338 <td>THOUSAND KWH</td> </td>	1.2338 <td>THOUSAND KWH</td>	THOUSAND KWH	
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS <td>-0.216 <td>THOUSAND KWH</td> </td>	-0.216 <td>THOUSAND KWH</td>	THOUSAND KWH	

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

	1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	9.666	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY <td>9.846 <td>THOUSAND KWH</td> </td>	9.846 <td>THOUSAND KWH</td>	THOUSAND KWH	
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY <td>1.0933 <td></td> </td>	1.0933 <td></td>		
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA <td>178615.957 <td>THOUSAND KWH</td> </td>	178615.957 <td>THOUSAND KWH</td>	THOUSAND KWH	
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA <td>218583.671 <td>THOUSAND KWH</td> </td>	218583.671 <td>THOUSAND KWH</td>	THOUSAND KWH	
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA <td>1.2238 <td></td> </td>	1.2238 <td></td>		

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT
 WHEN INCOME IS RAISED BY 10 PERCENT
 WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT
 WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT
 WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASF.

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

OBSERVATION NUMBER IS: 92

UTILITY NAME: OHIO EDISON COMPANY

CITY NAME: CLEVELAND

(FEA REGION 5)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

	1975 ELECTRICITY PRICE	22.41	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	24.80	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	13244.00	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	18790.07	\$/MILLION BTU	
1975 FAMILY INCOME	3271.	\$/YEAR	PROJECTED 1985 FAMILY INCOME	3419.	\$/YEAR	
1975 HEATING DEGREE DAYS	705169	DAYS	EXPECTED (AVERAGED) 1985 HEATING DEGREE DAYS	799000	DAYS	
1975 NUMBER OF CUSTOMERS			PROJECTED 1985 NUMBER OF CUSTOMERS			

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A REAL PRICE INDEX

DEMAND COMPONENT ANALYSIS

	CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-0.871	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME <td>1.595 <td>THOUSAND KWH</td> </td>	1.595 <td>THOUSAND KWH</td>	THOUSAND KWH	
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE <td>-0.734 <td>THOUSAND KWH</td> </td>	-0.734 <td>THOUSAND KWH</td>	THOUSAND KWH	
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS <td>-0.172 <td>THOUSAND KWH</td> </td>	-0.172 <td>THOUSAND KWH</td>	THOUSAND KWH	

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

	1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	12.435	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY <td>13.626 <td>THOUSAND KWH </td></td>	13.626 <td>THOUSAND KWH </td>	THOUSAND KWH	
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY <td>1.0958 <td></td> </td>	1.0958 <td></td>		
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA <td>876889.703 <td>THOUSAND KWH</td> </td>	876889.703 <td>THOUSAND KWH</td>	THOUSAND KWH	
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA <td>10887210.993 <td>THOUSAND KWH</td> </td>	10887210.993 <td>THOUSAND KWH</td>	THOUSAND KWH	
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA <td>1.2416 <td></td> </td>	1.2416 <td></td>		

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

	WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-720120.439	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT <td>263944.220 <td>THOUSAND KWH</td> </td>	263944.220 <td>THOUSAND KWH</td>	THOUSAND KWH	
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT <td>106357.676 <td>THOUSAND KWH</td> </td>	106357.676 <td>THOUSAND KWH</td>	THOUSAND KWH	
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT <td>-314586.574 <td>THOUSAND KWH</td> </td>	-314586.574 <td>THOUSAND KWH</td>	THOUSAND KWH	
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT <td>-10986073.038 <td>THOUSAND KWH</td> </td>	-10986073.038 <td>THOUSAND KWH</td>	THOUSAND KWH	

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 93

UTILITY NAME: OHIO POWER COMPANY

CITY NAME: CLEVELAND

(FEA REGION 5)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	22.41	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	24.80	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.73	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	3.04	\$/MILLION BTU
1975 FAMILY INCOME	13244.00	\$/YEAR	PROJECTED 1985 FAMILY INCOME	13533.44	\$/YEAR
1975 HEATING DEGREE DAYS	3271.		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	3419.	
1975 NUMBER OF CUSTOMERS	50865		PROJECTED 1985 NUMBER OF CUSTOMERS	57550	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A REAL PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-.871	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	.093	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.734	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-.172	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	12.435	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	12.167	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	.9785	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	6327817.954	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	7302390.267	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.1066	

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-463164.016	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	234080.103	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	68406.680	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-202335.748	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-706253.969	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

OBSERVATION NUMBER IS: 94

UTILITY NAME: BUCKEYE POWER COOP. INC.

CITY NAME: COLUMBUS

(FEA REGION 5)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	50.70	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	56.09	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.80	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	3.16	\$/MILLION BTU
1975 FAMILY INCOME	13329.08	\$/YEAR	PROJECTED 1985 FAMILY INCOME	18933.94	\$/YEAR
1975 HEATING DEGREE DAYS	2936		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	3167	
1975 NUMBER OF CUSTOMERS	10858		PROJECTED 1985 NUMBER OF CUSTOMERS	12800	

STATE DUMPY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-.505	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	.928	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.425	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-.172	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	7.206	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	7.819	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0852	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	78239.756	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	100687.306	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.2792	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-6620.145	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	3345.779	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	977.758	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-2962.691	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-10932.719	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 95

UTILITY NAME: THE TOLEDO EDISON CO.

CITY NAME: CLEVELAND

(FEA REGION 5)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	22.41	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	24.80	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.73	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	3.04	\$/MILLION BTU
1975 FAMILY INCOME	13244.00	\$/YEAR	PROJECTED 1985 FAMILY INCOME	18664.18	\$/YEAR
1975 HEATING DEGREE DAYS	3271.		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	3419.	
1975 NUMBER OF CUSTOMERS	222712		PROJECTED 1985 NUMBER OF CUSTOMERS	255700	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A PEAL PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-0.671	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	1.614	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	-0.734	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-0.172	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	12.435	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	13.645	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0973	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	2769459.468	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	3488914.714	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.2598	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-230769.735	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	116629.534	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	34083.372	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-100813.028	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-391886.393	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 96

UTILITY NAME: ORPVILLE MUNICIPAL UTILITIES
CITY NAME: DAYTON (FEA REGION 5)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	44.17	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	43.87	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.85	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	3.24	\$/MILLION BTU
1975 FAMILY INCOME	14318.00	\$/YEAR	PROJECTED 1985 FAMILY INCOME	20356.57	\$/YEAR
1975 HEATING DEGREE DAYS	2883.		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	3134.	
1975 NUMBER OF CUSTOMERS	4233		PROJECTED 1985 NUMBER OF CUSTOMERS	4700	

STATE DUMPY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A REAL PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-573	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	1.055	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.482	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-.214	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	8.176	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	8.854	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0828	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	34610.987	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	41612.030	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.2023	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-2752.374	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	1391.032	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	406.516	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-1234.231	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-4583.241	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 97

UTILITY NAME: OKLAHOMA GAS AND ELECTRIC CO.

CITY NAME: OKLAHOMA CITY (FEA REGION 6)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	30.16	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	43.23	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.20	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	2.43	\$/MILLION BTU
1975 FAMILY INCOME	1645.05	\$/YEAR	PROJECTED 1985 FAMILY INCOME	15466.50	\$/YEAR
1975 HEATING DEGREE DAYS	2075		EXPECTED (AVERAGE) 1965 HEATING DEGREE DAYS		
1975 NUMBER OF CUSTOMERS	445897		PROJECTED 1985 NUMBER OF CUSTOMERS	484800	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-2.369	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY INCOME	1.071	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.778	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	.032	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	10.408	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	9.258	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	.9183	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	4640934.590	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	4633657.074	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	.9984	

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT
 WHEN INCOME IS RAISED BY 10 PERCENT
 WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT
 WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT
 WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

-306487.233	THOUSAND KWH
154896.668	THOUSAND KWH
45266.414	THOUSAND KWH
-126839.696	THOUSAND KWH
-541397.863	THOUSAND KWH

OBSERVATION NUMBER IS: 98

UTILITY NAME: DUQUESNE LIGHT COMPANY

CITY NAME: PITTSBURGH

(FEA REGION 3)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	56.53	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	58.76	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	2.97	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	3.37	\$/MILLION BTU
1975 FAMILY INCOME	12065.00	\$/YEAR	PROJECTED 1985 FAMILY INCOME	16903.41	\$/YEAR
1975 HEATING DEGREE DAYS	3151		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	2932	
1975 NUMBER OF CUSTOMERS	478343		PROJECTED 1985 NUMBER OF CUSTOMERS	497600	

STATE DUMMY VARIABLE IS RELEVANT, STATE IS: PENNSYLVANIA

MONETARY VARIABLES ARE DEFLATED BY A REAL PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-.166	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	.747	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.309	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	.140	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	6.055	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	7.114	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.1750	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	2896184.199	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	3539957.948	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.2223	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-234145.923	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	118335.838	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	34582.015	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-105692.839	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-406351.578	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 99

UTILITY NAME: METROPOLITAN EDISON COMPANY

CITY NAME: HARRISBURG (FEA REGION 3)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	38.88	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	40.41	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	2.03	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	3.31	\$/MILLION BTU
1975 FAMILY INCOME	12047.00	\$/YEAR	PROJECTED 1985 FAMILY INCOME	16999.28	\$/YEAR
1975 HEATING DEGREE DAYS	2832.		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	2902.	
1975 NUMBER OF CUSTOMERS	292877		PROJECTED 1985 NUMBER OF CUSTOMERS	322900	

STATE DUMMY VARIABLE IS RELEVANT, STATE IS: PENNSYLVANIA

MONETARY VARIABLES ARE DEFLATED BY A PEAL PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-238	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	1.097	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-444	THOUSAND KWH
	-4096	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	8.698	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	9.902	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.1365	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	2547463.619	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	3197491.480	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.2552	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-211493.922	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	106887.663	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	31236.444	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-95483.033	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-368816.266	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 100

UTILITY NAME: PENNSYLVANIA POWER COMPANY

CITY NAME: ERIE

(FEA REGION 3)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	\$6.13	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	58.34	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.62	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	2.96	\$/MILLION BTU
1975 FAMILY INCOME	10633.80	\$/YEAR	PROJECTED 1985 FAMILY INCOME	15081.11	\$/YEAR
1975 HEATING DEGREE DAYS	9271.		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	3806.	
1975 NUMBER OF CUSTOMERS	101129		PROJECTED 1985 NUMBER OF CUSTOMERS	111100	

STATE CUPMY VARIABLE IS RELEVANT, STATE IS: PENNSYLVANIA

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-.164	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	.768	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.306	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-.274	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	5.992	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	6.594	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.1004	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	605978.972	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	732592.331	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.2009	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-48456.369	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	24459.536	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	7156.729	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-19735.936	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-60786.995	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 101

UTILITY NAME: PENNSYLVANIA ELECTRIC COMPANY

CITY NAME: ERIE (FEA REGION 3)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	56.13	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	59.34	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.82	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	2.06	\$/MILLION BTU
1975 FAMILY INCOME	10633.80	\$/YEAR	PROJECTED 1985 FAMILY INCOME	14804.71	\$/YEAR
1975 HEATING DEGREE DAYS	3271.		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	3806.	
1975 NUMBER OF CUSTOMERS	424694		PROJECTED 1985 NUMBER OF CUSTOMERS	474000	

STATE DUMMY VARIABLE IS RELEVANT, STATE IS: PENNSYLVANIA

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-0.164	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	.725	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.306	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-0.274	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	5.992	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	6.552	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0934	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	2544825.258	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	3105668.359	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.2204	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-205420.402	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	103818.145	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	30338.420	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-83666.274	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-257693.454	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 102

UTILITY NAME: PENNSYLVANIA POWER AND LIGHT CO.

CITY NAME: HARRISBURG (FEA REGION 3)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	34.88	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	40.41	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	2.03	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	3.31	\$/MILLION BTU
1975 FAMILY INCOME	12047.00	\$/YEAR	PROJECTED 1985 FAMILY INCOME	17223.37	\$/YEAR
1975 HEATING DEGREE DAYS	2602.		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	884300	
1975 NUMBER OF CUSTOMERS	799486		PROJECTED 1985 NUMBER OF CUSTOMERS	884300	

STATE DUMPY VARIABLE IS RELEVANT, STATE IS: PENNSYLVANIA

MONETARY VARIABLES ARE DEFLATED BY A REAL PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-0.238	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	1.142	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.444	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-0.096	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	8.698	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	9.947	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.1436	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	6953962.385	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	8796363.962	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.2649	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-581824.076	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	294050.132	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	-85932.093	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-262675.764	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-1014621.045	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 103

UTILITY NAME: PENNSYLVANIA POWER AND LIGHT CO.

CITY NAME: SCRANTON

(FEA REGION 3)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	33.86	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	35.20	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.84	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	2.87	\$/MILLION BTU
1975 FAMILY INCOME	8856.68	\$/YEAR	PROJECTED 1985 FAMILY INCOME	12662.20	\$/YEAR
1975 HEATING DEGREE DAYS	3235		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	3487	
1975 NUMBER OF CUSTOMERS	799486		PROJECTED 1985 NUMBER OF CUSTOMERS	884300	

STATE DUMMY VARIABLE IS RELEVANT, STATE IS: PENNSYLVANIA

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	--.215	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	1.631	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	-.401	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	--.283	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	7.856	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	8.758	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.1148	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	6280713.867	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	7744608.231	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.2331	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-512257.059	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	256891.410	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	-75657.442	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-221714.204	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-760238.577	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

UTILITY NAME: PHILADELPHIA ELECTRIC CO.

CITY NAME: PHILADELPHIA

(FEA REGION 3)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

	1975 ELECTRICITY PRICE	56.98	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	59.22	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	2.40	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	3.91	\$/MILLION BTU	
1975 FAMILY INCOME	12429.00	\$/YEAR	PROJECTED 1985 FAMILY INCOME	17304.04	\$/YEAR	
1975 HEATING DEGREE DAYS	2436		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	2703		
1975 NUMBER OF CUSTOMERS	1094270		PROJECTED 1985 NUMBER OF CUSTOMERS	1224500		

STATE DUMMY VARIABLE IS RELEVANT, STATE IS: PENNSYLVANIA

MONETARY VARIABLES ARE DEFLATED BY A REAL

PRICE INDEX

DEMAND COMPONENT ANALYSIS

	CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-.189	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME <td>.835 <td>THOUSAND KWH</td> </td>	.835 <td>THOUSAND KWH</td>	THOUSAND KWH	
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE <td>.352 <td>THOUSAND KWH</td> </td>	.352 <td>THOUSAND KWH</td>	THOUSAND KWH	
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS <td>-.219 <td>THOUSAND KWH</td> </td>	-.219 <td>THOUSAND KWH</td>	THOUSAND KWH	

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

	1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	6.901	THOUSAND KWH
1985 PROJECTED ELECTRICITY CONSUMPTION PER FAMILY	7.657 <td>THOUSAND KWH</td>	THOUSAND KWH	
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.1095 <td></td>		
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	7572629.607 <td>THOUSAND KWH</td>	THOUSAND KWH	
1985 PROJECTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	9375667.610 <td>THOUSAND KWH</td>	THOUSAND KWH	
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.2381 <td></td>		

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-620141.325	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	313415.421	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	91591.331	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-278777.257	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-1107797.310	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 105

UTILITY NAME: WEST PENN POWER COMPANY

(FEA REGION 3)

CITY NAME: PITTSBURGH

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

	1975 ELECTRICITY PRICE \$/THOUSAND KWH	56.53	1985 ELECTRICITY PRICE \$/THOUSAND KWH	58.76	1985 NATURAL GAS PRICE \$/THOUSAND BTU	3.37	1985 FAMILY INCOME \$1000	17008.19	1985 HEATING DEGREE DAYS \$/YEAR	2932.
1975 NATURAL GAS PRICE	2.07		PROJECTED 1985 NATURAL GAS PRICE							
1975 FAMILY INCOME	12065.00		PROJECTED 1985 FAMILY INCOME							
1975 HEATING DEGREE DAYS	3151.		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS							
1975 NUMBER OF CUSTOMERS	432369		PROJECTED 1985 NUMBER OF CUSTOMERS							

STATE DUMMY VARIABLE IS RELEVANT, STATE IS: PENNSYLVANIA

MONETARY VARIABLES ARE DEFLATED BY A PEAL PRICE INDEX

DEMAND COMPONENT ANALYSIS

	1975-1985 CHANGE IN ELECTRICITY PRICE	1975-1985 CHANGE IN FAMILY INCOME PRICE	1975-1985 CHANGE IN NATURAL GAS PRICE	1975-1985 CHANGE IN HEATING DEGREE DAYS
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-0.166			
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME PRICE		0.761		
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE			0.309	
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS				0.149

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

	1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	6.655	7.125	2617829.186	3200319.099
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.01775	1.2225		

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

	1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA
WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-211680.953	106982.167	-211680.953	106982.167
WHEN INCOME IS RAISED BY 10 PERCENT	31264.068	-95552.212	31264.068	-95552.212
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	-367364.454		-367364.454	
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT				
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT				

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 106

UTILITY NAME: S. CAROLINA PUBLIC SERVICE AUTHORITY
CITY NAME: GREENVILLE (FEA REGION 4)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	37.81	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	42.41	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	2.55	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	4.68	\$/MILLION BTU
1975 FAMILY INCOME	10870.17	\$/YEAR	PROJECTED 1985 FAMILY INCOME	15054.00	\$/YEAR
1975 HEATING DEGREE DAYS	1689		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	1757	
1975 NUMBER OF CUSTOMERS	27385		PROJECTED 1985 NUMBER OF CUSTOMERS	24500	

STATE DUMPY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-.814	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	1.222	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.656	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-.118	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	10.281	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	11.139	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0834	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	281553.987	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	272910.722	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	.9693	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-18051.325	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	9123.023	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	2666.078	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-6927.310	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-30263.981	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OPS-ERVATION NUMBER IS: 107

UTILITY NAME: S. CAROLINA ELECTRIC AND GAS CO.

CITY NAME: COLUMBIA (FEA REGION 4)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	45.80	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	51.36	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	2.74	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	5.03	\$/MILLION BTU
1975 FAMILY INCOME	10735.11	\$/YEAR	PROJECTED 1985 FAMILY INCOME	14520.54	\$/YEAR
1975 HEATING DEGREE DAYS	1217.		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	1443.	
1975 NUMBER OF CUSTOMERS	263711		PROJECTED 1985 NUMBER OF CUSTOMERS	266700	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-7.783	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	1.083	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.631	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-.359	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	9.680	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	10.351	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0477	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	2605366.503	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	2760571.330	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.0596	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-182594.407	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	92282.035	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	26968.151	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-61942.594	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-278372.297	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 108

UTILITY NAME: TENNESSEE VALLEY AUTHORITY

CITY NAME: KNOXVILLE

(FEA REGION 4)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	25.75	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	28.89	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.61	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	2.95	\$/MILLION BTU
1975 FAMILY INCOME	10420.69	\$/YEAR	PROJECTED 1985 FAMILY INCOME	14253.54	\$/YEAR
1975 HEATING DEGREE DAYS	1901		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	1932	
1975 NUMBER OF CUSTOMERS	2192972		PROJECTED 1985 NUMBER OF CUSTOMERS	2485800	

STATE CUPPY VARIABLE IS RELEVANT, STATE IS: TENNESSEE

MONETARY VARIABLES ARE DEFLATED BY A SURFPGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-1.181	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	1.702	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.952	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-.066	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	14.916	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	16.206	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0865	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	32709960.568	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	40285689.302	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.2316	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-2664657.656	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	1346700.875	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	393554.745	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-1071807.630	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-4625543.333	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 109

UTILITY NAME: TENNESSEE VALLEY AUTHORITY

CITY NAME: MEMPHIS

(FEA REGION 4)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	28.32	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	31.75	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.19	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	2.18	\$/MILLION BTU
1975 FAMILY INCOME	19987.78	\$/YEAR	PROJECTED 1985 FAMILY INCOME	15029.21	\$/YEAR
1975 HEATING DEGREE DAYS	1601.		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS		1793.
1975 NUMBER OF CUSTOMERS	2192972		PROJECTED 1985 NUMBER OF CUSTOMERS	2485800	

STATE DUMMY VARIABLE IS RELEVANT, STATE IS: TENNESSEE

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-1.073	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	1.346	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.865	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-.387	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	13.545	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	14.360	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0602	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	2976366.702	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	35696277.436	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.2017	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-2361083.937	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	1193276.577	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	348718.611	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-913611.186	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-3990767.141	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 110

UTILITY NAME: TENNESSEE VALLEY AUTHORITY

CITY NAME: NASHVILLE

(FEA REGION 4)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

	1975 ELECTRICITY PRICE \$/THOUSAND KWH	21.79	PROJECTED 1985 ELECTRICITY PRICE \$ /THOUSAND KWH	24.45
1975 NATURAL GAS PRICE \$/MILLION BTU	11865.00	1841.	PROJECTED 1985 NATURAL GAS PRICE \$/MILLION BTU	4.22
1975 FAMILY INCOME \$/YEAR	2192972	1841.	PROJECTED 1985 FAMILY INCOME \$/YEAR	16229.08
1975 HEATING DEGREE DAYS	1841.	1841.	EXPECTED 1985 HEATING DEGREE DAYS	2053.
1975 NUMBER OF CUSTOMERS	2192972	2192972	PROJECTED 1985 NUMBER OF CUSTOMERS	2485800

STATE DUMMY VARIABLE IS RELEVANT, STATE IS: TENNESSEE

MONETARY VARIABLES ARE DEFLATED BY A REAL

PRICE INDEX

DEMAND COMPONENT ANALYSIS

	CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-1.427	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	2.056	2.056	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	1.150	1.150	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-0.936	-0.936	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

	1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	18.014	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	19.075 <td>19.075 <td>THOUSAND KWH </td></td>	19.075 <td>THOUSAND KWH </td>	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0589	1.0589	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	39504357.092	39504357.092	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	47417604.357	47417604.357	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.2003	1.2003	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

	WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-3136375.891	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	1585104.125	1585104.125	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	463224.804	463224.804	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-1297988.705	-1297988.705	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-5240286.921	-5240286.921	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 111

UTILITY NAME: DALLAS POWER AND LIGHT COMPANY

CITY NAME: DALLAS

(FEA REGION 6)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	29.35	1/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	42.06	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.34	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	2.73	\$/MILLION BTU
1975 FAMILY INCOME	13118.00	\$/YEAR	PROJECTED 1985 FAMILY INCOME	17545.83	\$/YEAR
1975 HEATING DEGREE DAYS	1260.		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	1323.	
1975 NUMBER OF CUSTOMERS	222050		PROJECTED 1985 NUMBER OF CUSTOMERS	256900	

STATE DUMMY VARIABLE IS RELEVANT, STATE IS: TEXAS

MCNETARY VARIABLES ARE DEFLATED BY A REAL PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-2.797	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	1.297	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.919	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-.127	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	12.288	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	11.161	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	.9083	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	2728603.821	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	2867230.541	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.0508	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-189649.242	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	95847.503	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	28010.110	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-60654.115	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-275117.896	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 112

 UTILITY NAME: TEXAS POWER AND LIGHT COMPANY
 CITY NAME: FT WORTH (FEA REGION 6)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	29.35	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	42.06	1/THOUSAND KWH
1975 NATURAL GAS PRICE	11.34	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	2.73	\$/MILLION BTU
1975 FAMILY INCOME	13118.00	\$/YEAR	PROJECTED 1985 FAMILY INCOME	17554.97	\$/YEAR
1975 HEATING DEGREE DAYS	1269.		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	1323.	
1975 NUMBER OF CUSTOMERS	482347		PROJECTED 1985 NUMBER OF CUSTOMERS	474600	

STATE DUMMY VARIABLE IS RELEVANT, STATE IS: TEXAS

MONETARY VARIABLES ARE DEFLATED BY A REAL PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-2.797	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	1.299	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	0.919	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-0.127	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	12.288	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	11.163	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	0.9084	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	6000925.422	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	5297906.192	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	0.8828	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-350423.128	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	177101.586	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	51755.494	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-112073.238	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-508347.266	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 113

UTILITY NAME: TEXAS ELECTRIC SERVICE COMPANY

CITY NAME: FT WORTH (FEA REGION 6)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	29.35	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	42.06	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.34	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	2.73	\$/MILLION BTU
1975 FAMILY INCOME	13118.00	\$/YEAR	PROJECTED 1985 FAMILY INCOME	18350.15	\$/YEAR
1975 HEATING DEGREE DAYS	1260.		PROJECTED (AVERAGE) 1985 HEATING DEGREE DAYS	1323.	
1975 NUMBER OF CUSTOMERS	368732		PROJECTED 1985 NUMBER OF CUSTOMERS	533300	

STATE DUMMY VARIABLE IS RELEVANT, STATE IS: TEXAS

MCNETARY VARIABLES ARE DEFLATED BY A REAL PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-2.797	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	1.519	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.919	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-.127	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	12.288	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	11.343	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	.9231	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	4531067.525	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	3780730.796	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	.8344	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-250071.531	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	126384.537	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	36934.137	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-79978.528	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-362770.516	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

UTILITY NAME: UTAH POWER AND LIGHT COMPANY
CITY NAME: SALT LAKE CITY (FEA REGION 8)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	33.64	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	40.10	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.21	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	2.83	\$/MILLION BTU
1975 FAMILY INCOME	11859.13	\$/YEAR	PROJECTED 1985 FAMILY INCOME	16551.74	\$/YEAR
1975 HEATING DEGREE DAYS	3329.		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	3324.	
1975 NUMBER OF CUSTOMERS	303459		PROJECTED 1985 NUMBER OF CUSTOMERS	306200	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-.824	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	.847	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.625	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	.003	THOUSAND KWH

NOTE: COMPONENTS VARIABLES ARE CHANGED SEPARATELY IN TABLE TWO BECAUSE IN THE COMPONENT EFFECTS ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	6.950	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	7.495	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0784	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	2109004.493	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	2294951.505	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.0882	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-151796.586	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	76717.016	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	22419.489	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-67044.220	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-239391.976	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 115

UTILITY NAME: VIRGINIA ELECTRIC AND POWER CO.

CITY NAME: RICHMOND

(FEA REGION 3)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	45.66	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	47.46	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	3.81	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	6.20	\$/MILLION BTU
1975 FAMILY INCOME	11790.71	\$/YEAR	PROJECTED 1985 FAMILY INCOME	15955.12	\$/YEAR
1975 HEATING DEGREE DAYS	451.		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	2188.	
1975 NUMBER OF CUSTOMERS	1027601		PROJECTED 1985 NUMBER OF CUSTOMERS	1101900	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-252	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	1.013	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-470	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-271	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	9.210	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	10.257	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.1137	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	9466031.016	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	11301984.465	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.1940	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-747555.092	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	377839.517	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	110409.617	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-317684.495	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-1338551.953	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 116

UTILITY NAME: VIRGINIA ELECTRIC AND POWER CO.

CITY NAME: NORFOLK

(FEA REGION 3)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	44.12	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	45.86	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	2.91	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	4.74	\$/MILLION BTU
1975 FAMILY INCOME	9887.54	\$/YEAR	PROJECTED 1985 FAMILY INCOME	13379.75	\$/YEAR
1975 HEATING DEGREE DAYS	1755		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS		1938
1975 NUMBER OF CUSTOMERS	1027801		PROJECTED 1985 NUMBER OF CUSTOMERS	1101900	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-.240	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	-.965	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	-.447	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-.226	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	8.774	THOUSAND KWH
1985 PROJECTED ELECTRICITY CONSUMPTION PER FAMILY	9.699	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.1054	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	9018176.774	THOUSAND KWH
1985 PROJECTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	10667859.149	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.1851	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-76834.570	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	357280.167	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	104410.198	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-284784.382	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-1228371.668	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 117

UTILITY NAME: APPALACHIAN POWER COMPANY

CITY NAME: ROANOKE

(FEA REGION 3)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	36.46	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	37.90	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	2.05	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	3.34	\$/MILLION BTU
1975 FAMILY INCOME	1148.92	\$/YEAR	PROJECTED 1985 FAMILY INCOME	14487.91	\$/YEAR
1975 HEATING DEGREE DAYS	2252.		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	2393.	
1975 NUMBER OF CUSTOMERS	577461		PROJECTED 1985 NUMBER OF CUSTOMERS	593500	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-.253	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.873	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	.471	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-.167	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	9.229	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	10.140	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0987	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	5329258.961	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	6017865.158	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.1292	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-398043.880	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	201168.807	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	58788.807	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-174392.619	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-719316.024	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 118

UTILITY NAME: APPALACHIAN POWER COMPANY

CITY NAME: CHARLESTON (F&A REGION 3)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	36.45	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	37.88	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	2.03	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	3.30	\$/MILLION BTU
1975 FAMILY INCOME	10568.15	\$/YEAR	PROJECTED 1985 FAMILY INCOME	13733.21	\$/YEAR
1975 HEATING DEGREE DAYS	2509		PROJECTED (AVERAGE) 1985 HEATING DEGREE DAYS	2550	
1975 NUMBER OF CUSTOMERS	577461		PROJECTED 1985 NUMBER OF CUSTOMERS	593500	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-.247	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	.853	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.460	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-.045	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	9.014	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	10.036	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.1133	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	5205218.316	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	5956117.268	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.1443	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-393959.646	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	199104.661	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	58185.589	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-175381.637	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-710309.908	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 119

UTILITY NAME: MONONGAHELA POWER COMPANY

CITY NAME: CHARLESTON

(FEA REGION 3)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	36.45	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	37.88	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	2.03	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	3.30	\$/MILLION BTU
1975 FAMILY INCOME	10568.15	\$/YEAR	PROJECTED 1985 FAMILY INCOME	13557.55	\$/YEAR
1975 HEATING DEGREE DAYS	2509		PROJECTED 1985 HEATING DEGREE DAYS	2550	
1975 NUMBER OF CUSTOMERS	241995		PROJECTED 1985 NUMBER OF CUSTOMERS	235100	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-.247	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	.809	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.460	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-.045	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	9.014	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	9.991	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.1084	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	2181336.586	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	2348909.564	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.0768	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-155365.574	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	78520.758	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	22946.608	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-69165.127	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-280203.267	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 120

UTILITY NAME: DAIRYLAND POWER COOPERATION

CITY NAME: ROCHESTER

(FEA REGION 5)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	33.08	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	36.60	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.76	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	3.09	\$/MILLION BTU
1975 FAMILY INCOME	12632.73	\$/YEAR	PROJECTED 1985 FAMILY INCOME	18337.29	\$/YEAR
1975 HEATING DEGREE DAYS	4484		PROJECTED 1985 HEATING DEGREE DAYS	4570	
1975 NUMBER OF CUSTOMERS	139106		PROJECTED 1985 NUMBER OF CUSTOMERS	149900	

STATE DUMPY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURPOGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-0.172	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	1.120	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.481	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-.037	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	8.162	THOUSAND KWH
1985 PROJECTED ELECTRICITY CONSUMPTION PER FAMILY	9.099	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.1148	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1135343.098	THOUSAND KWH
1985 PROJECTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	1363907.931	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.2013	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-99213.860	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	45593.502	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	13324.072	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-27215.627	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-36717.356	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 121

UTILITY NAME: MADISON GAS AND ELECTRIC CO.

CITY NAME: MILWAUKEE

(FEA REGION 5)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	34.09	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	37.71	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.99	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	3.48	\$/MILLION BTU
1975 FAMILY INCOME	12581.00	\$/YEAR	PROJECTED 1985 FAMILY INCOME	17967.93	\$/YEAR
1975 HEATING DEGREE DAYS	3900.		PROJECTED (AVERAGE) 1985 HEATING DEGREE DAYS	4135.	
1975 NUMBER OF CUSTOMERS	75351		PROJECTED 1985 NUMBER OF CUSTOMERS	90800	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A REAL PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-0.548	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	1.024	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	-0.462	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-0.130	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	7.826	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	8.572	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0953	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	569710.920	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	778309.253	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.3196	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-51480.255	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	26317.789	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	-7603.340	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-19027.324	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-48837.601	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 122

UTILITY NAME: WISCONSIN ELECTRIC POWER CO.

CITY NAME: MILWAUKEE

(FEA REGION 5)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

	1975 ELECTRICITY PRICE \$ / THOUSAND KWH	1975 NATURAL GAS PRICE \$/ MILLION BTU	1975 FAMILY INCOME \$/ YEAR	1975 HEATING DEGREE DAYS 3900	1975 NUMBER OF CUSTOMERS 589627	PROJECTED 1985 ELECTRICITY PRICE 37.71	PROJECTED 1985 NATURAL GAS PRICE 3.48	PROJECTED 1985 FAMILY INCOME 17570.42	PROJECTED 1985 HEATING DEGREE DAYS 4135	PROJECTED 1985 NUMBER OF CUSTOMERS 618500
STATE DUMPHY VARIABLE IS NOT RELEVANT										

MONETARY VARIABLES ARE DEFLATED BY A REAL

PRICE INDEX

DEMAND COMPONENT ANALYSIS

	CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME PRICE	CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	
NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.					

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

	1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	1975 TO 1985 ELECTRICITY CONSUMPTION PER FAMILY	1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	1975 TO 1985 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA
RATIO OF 1985 TO 1975	7.826	8.506	1.0868	4614530.409	226627.195	THOUSAND KWH
						THOUSAND KWH

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

	WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	WHEN INCOME IS RAISED BY 10 PERCENT	WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT
	-247970.586	175862.087	51293.268	-128591.150	-350108.089
	THOUSAND KWH	THOUSAND KWH	THOUSAND KWH	THOUSAND KWH	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 123

UTILITY NAME: WISCONSIN ELECTRIC POWER CO.

CITY NAME: RACINE

(FEA REGION 5)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	34.09	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	37.71	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.79	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	3.14	\$/MILLION BTU
1975 FAMILY INCOME	12172.00	\$/YEAR	PROJECTED 1985 FAMILY INCOME	16999.22	\$/YEAR
1975 HEATING DEGREE DAYS	3900.		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	4135.	
1975 NUMBER OF CUSTOMERS	589627		PROJECTED 1985 NUMBER OF CUSTOMERS	618500	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A REAL

PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-.536	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	.935	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.452	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-.127	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	7.655	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	6.320	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0868	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	4513681.661	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	5145854.112	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.1401	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-340365.841	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	172018.608	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	50270.091	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-125780.846	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-322893.721	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 124

UTILITY NAME: WISCONSIN POWER AND LIGHT CO.

CITY NAME: APPLETON

(FEA REGION 5)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	32.24	\$/THOUSAND KWH	PROJECTED 1965 ELECTRICITY PRICE	35.67	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.73	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	3.03	\$/MILLION BTU
1975 FAMILY INCOME	12801.00	\$/YEAR	PROJECTED 1985 FAMILY INCOME	18262.13	\$/YEAR
1975 HEATING DEGREE DAYS	4423		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	4498	
1975 NUMBER OF CUSTOMERS	231533		PROJECTED 1985 NUMBER OF CUSTOMERS	279000	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A REAL

PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-.525	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME PRICE	.981	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.442	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-.031	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	7.500	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	8.318	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.1090	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1736476.573	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	2320646.155	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.3364	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-153496.126	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	77575.952	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	22670.501	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-48249.053	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-805335.401	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 125

UTILITY NAME: WISCONSIN PUBLIC SERVICE COOPERATION

CITY NAME: GREEN BAY (FEA REGION 5)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

	1975 ELECTRICITY PRICE	47.16	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	52.18	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.88	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	3.30	\$/MILLION BTU	
1975 FAMILY INCOME	12331.00	\$/YEAR	PROJECTED 1985 FAMILY INCOME	17522.33	\$/YEAR	
1975 HEATING DEGREE DAYS	4423		PROJECTED 1985 HEATING DEGREE DAYS	4498		
1975 NUMBER OF CUSTOMERS	217533		PROJECTED 1985 NUMBER OF CUSTOMERS	221900		

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A REAL

PRICE INDEX

DEMAND COMPONENT ANALYSIS

	CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-0.398	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME <td>-0.732 <td>THOUSAND KWH</td> </td>	-0.732 <td>THOUSAND KWH</td>	THOUSAND KWH	
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE <td>-0.335 <td>THOUSAND KWH</td> </td>	-0.335 <td>THOUSAND KWH</td>	THOUSAND KWH	
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS <td>-0.024 <td>THOUSAND KWH</td> </td>	-0.024 <td>THOUSAND KWH</td>	THOUSAND KWH	

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

	1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	5.683	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	6.292 <td>THOUSAND KWH</td>	THOUSAND KWH	
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.1071		
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1236327.945 <td>THOUSAND KWH</td>	THOUSAND KWH	
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	1396237.240 <td>THOUSAND KWH</td>	THOUSAND KWH	
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.1293		

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT
 WHEN INCOME IS RAISED BY 10 PERCENT
 WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT
 WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT
 WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT

-92352.30C THOUSAND KWH
 46674.256 THOUSAND KWH
 13639.907 THOUSAND KWH
 -29029.469 THOUSAND KWH
 -48454.835 THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 126

UTILITY NAME: PACIFIC POWER AND LIGHT CO.

CITY NAME: PORTLAND

(FEA REGION 10)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	20.53	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	22.35	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	2.64	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	4.61	\$/MILLION BTU
1975 FAMILY INCOME	11031.25	\$/YEAR	PROJECTED 1985 FAMILY INCOME	9545.40	\$/YEAR
1975 HEATING DEGREE DAYS	474226		PROJECTED 1985 HEATING DEGREE DAYS	2662	
1975 NUMBER OF CUSTOMERS	474226		PROJECTED 1985 NUMBER OF CUSTOMERS	495700	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-0.690	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	-0.569	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	0.696	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	1.592	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	11.609	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	12.520	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0785	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	5505401.841	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	6266263.263	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.1273	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-410505.228	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	207466.692	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	60629.277	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-184155.233	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 20 PERCENT	-735739.571	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 127

UTILITY NAME: PUGET SOUND POWER AND LIGHT CO.

CITY NAME: SEATTLE

(FEA REGION 10)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	11.74	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	12.78	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	2.60	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	4.61	\$/MILLION BTU
1975 FAMILY INCOME	13507.00	\$/YEAR	PROJECTED 1985 FAMILY INCOME	18265.25	\$/YEAR
1975 HEATING DEGREE DAYS	2645		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	2626	
1975 NUMBER OF CUSTOMERS	364205		PROJECTED 1985 NUMBER OF CUSTOMERS	384700	

STATE DUMMY VARIABLE IS RELEVANT, STATE IS: WASHINGTON

MONETARY VARIABLES ARE DEFLATED BY A REAL PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-764	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	1.410	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.770	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	.029	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	12.856	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	14.249	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.1088	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	4680208.960	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	5461503.812	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.1712	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-362566.955	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	183238.998	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	53549.068	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-162302.832	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-651414.774	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 128

UTILITY NAME: CONSOLIDATED EDISON OF NEW YORK

CITY NAME: NEW YORK (FEA REGION 2)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

	1975 ELECTRICITY PRICE	64.76	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	75.75	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	2.45	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	3.46	\$/MILLION BTU	
1975 FAMILY INCOME	11229.30	\$/YEAR	PROJECTED 1985 FAMILY INCOME	16182.09	\$/YEAR	
1975 HEATING DEGREE DAYS	2441		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	2727		
1975 NUMBER OF CUSTOMERS	2441157		PROJECTED 1985 NUMBER OF CUSTOMERS	2806500		

STATE DUMMY VARIABLE IS RELEVANT, STATE IS: NEW YORK

MONETARY VARIABLES ARE DEFLATED BY A REAL PRICE INDEX

DEMAND COMPONENT ANALYSIS

	CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	.305	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME <td>.487 <td>THOUSAND KWH</td> </td>	.487 <td>THOUSAND KWH</td>	THOUSAND KWH	
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE <td>.130 <td>THOUSAND KWH</td> </td>	.130 <td>THOUSAND KWH</td>	THOUSAND KWH	
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS <td>-.077 <td>THOUSAND KWH</td> </td>	-.077 <td>THOUSAND KWH</td>	THOUSAND KWH	

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

	1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	3.623	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	4.517 <td>THOUSAND KWH</td>	THOUSAND KWH	
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.2467		
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	8844321.877 <td>THOUSAND KWH</td>	THOUSAND KWH	
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	12676334.660 <td>THOUSAND KWH</td>	THOUSAND KWH	
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.4333		

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-638459.702	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	423752.120	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	123831.709	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-377294.817	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 20 PERCENT	-1494513.385	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 129

UTILITY NAME: UGI COOPERATION

CITY NAME: PHILADELPHIA

(FEA REGION 3)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	56.98	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	59.22	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	2.40	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	3.91	\$/MILLION BTU
1975 FAMILY INCOME	12429.00	\$/YEAR	PROJECTED 1985 FAMILY INCOME	18544.57	\$/YEAR
1975 HEATING DEGREE DAYS	2436		EXPECTED (AVERAGED) 1985 HEATING DEGREE DAYS	2703	
1975 NUMBER OF CUSTOMERS	46993		PROJECTED 1985 NUMBER OF CUSTOMERS	47900	

STATE DUMMY VARIABLE IS RELEVANT, STATE IS: PENNSYLVANIA

MONETARY VARIABLES ARE DEFLATED BY A REAL PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-189	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	1.622	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-219	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	6.901	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	7.842	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.1363	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	324314.519	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	375623.526	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.1582	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-24845.131	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	12556.569	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	3669.484	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-11168.597	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-44382.423	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 130

UTILITY NAME: JERSEY CENTRAL POWER AND LIGHT
CITY NAME: ATLANTIC CITY (FEA REGION 2)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	54.90	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	49.06	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	2.21	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	3.12	\$/MILLION BTU
1975 FAMILY INCOME	10259.80	\$/YEAR	PROJECTED 1985 FAMILY INCOME	14785.38	\$/YEAR
1975 HEATING DEGREE DAYS	2714		PROJECTED (AVERAGE) 1985 HEATING DEGREE DAYS	2748	
1975 NUMBER OF CUSTOMERS	572494		PROJECTED 1985 NUMBER OF CUSTOMERS	658200	

STATE DUMPY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	.572	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	.912	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.283	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	-.027	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	6.790	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	8.616	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.2689	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	3887331.254	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	5671163.395	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.4589	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-37511.742	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	189579.052	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	55491.862	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-168926.982	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-667232.123	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 131

UTILITY NAME: NORTHWESTERN PUBLIC SERVICE CO.

CITY NAME: SOUX FALLS (FEA REGION 8)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	40.39	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	48.15	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	1.80	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	4.18	\$/MILLION BTU
1975 FAMILY INCOME	10942.62	\$/YEAR	PROJECTED 1985 FAMILY INCOME	14639.16	\$/YEAR
1975 HEATING DEGREE DAYS	4419.		PROJECTED (AVERAGE) 1985 HEATING DEGREE DAYS	4354.	
1975 NUMBER OF CUSTOMERS	39436		PROJECTED 1985 NUMBER OF CUSTOMERS	38400	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-821	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	732	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	624	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	626	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	6.929	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	7.388	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0663	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	273243.553	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	283767.247	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.0363	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-18765.448	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	9483.936	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	2771.549	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-6341.745	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-13213.917	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

UTILITY NAME: WASHINGTON WATER POWER CO.

CITY NAME: BOISE (FEA REGION 10)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	20.45	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	22.27	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	3.05	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	5.40	\$/MILLION BTU
1975 FAMILY INCOME	11573.30	\$/YEAR	PROJECTED 1985 FAMILY INCOME	15202.46	\$/YEAR
1975 HEATING DEGREE DAYS	3271		EXPECTED (AVERAGE) 1985 HEATING DEGREE DAYS	3240	
1975 NUMBER OF CUSTOMERS	170317		PROJECTED 1985 NUMBER OF CUSTOMERS	162600	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-779	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	1293	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	785	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	040	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	13.107	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	14.400	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.0986	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	2232394.890	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	2341380.332	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.0488	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-154867.563	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	78269.066	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	22873.054	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-68936.504	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-250681.733	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 133

UTILITY NAME: SEATTLE DEPARTMENT OF LIGHTING

CITY NAME: SEATTLE

(FEA REGION 10)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

	1975 ELECTRICITY PRICE 12.60 \$/THOUSAND KWH	1975 NATURAL GAS PRICE 13507.00 \$/MILLION BTU	1975 FAMILY INCOME 2645 \$/YEAR	1975 HEATING DEGREE DAYS 235314	1975 NUMBER OF CUSTOMERS 248500	PROJECTED 1985 ELECTRICITY PRICE 12.78 \$/THOUSAND KWH	PROJECTED 1985 NATURAL GAS PRICE 14.61 \$/MILLION BTU	PROJECTED 1985 FAMILY INCOME 18265.22 \$/YEAR	PROJECTED 1985 HEATING DEGREE DAYS 2626	PROJECTED 1985 NUMBER OF CUSTOMERS 248500
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STATE DUMMY VARIABLE IS RELEVANT, STATE IS: WASHINGTON

MONETARY VARIABLES ARE DEFLATED BY A PEAL PRICE INDEX

DEMAND COMPONENT ANALYSIS

	CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-764				THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	1.410				THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.770				THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	.029				THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

	1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY 12.850 THOUSAND KWH	1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY 14.248 THOUSAND KWH	RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY 1.1088	1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA 3023697.794 THOUSAND KWH	1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA 3540820.632 THOUSAND KWH	RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA 1.1709
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TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

	WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	WHEN INCOME IS RAISED BY 10 PERCENT	WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT
CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	-234202.981 THOUSAND KWH	118364.676 THOUSAND KWH	34590.443 THOUSAND KWH	-104640.795 THOUSAND KWH	-420786.513 THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 134

UTILITY NAME: IDAHO POWER COMPANY

CITY NAME: BOISE

(FEA REGION 10)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	20.45	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	22.27	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	3.05	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	5.40	\$/MILLION BTU
1975 FAMILY INCOME	11573.30	\$/YEAR	PROJECTED 1985 FAMILY INCOME	15822.95	\$/YEAR
1975 HEATING DEGREE DAYS	3271.		PROJECTED (AVERAGE) 1985 HEATING DEGREE DAYS		3240.
1975 NUMBER OF CUSTOMERS	168019		PROJECTED 1985 NUMBER OF CUSTOMERS	150100	

STATE DUMPY VARIABLE IS NOT RELEVANT

MONTARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-1.779	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	1.763	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.765	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	.040	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	13.107	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	14.600	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.1139	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	2202274.330	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	2191421.769	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	.9951	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-144948.748	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	73256.162	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	21438.102	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-64521.041	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 20 PERCENT	-234626.301	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

OBSERVATION NUMBER IS: 135

UTILITY NAME: PORTLAND GENERAL ELECTRIC COOP.

CITY NAME: PORTLAND

(FEA REGION 10)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	40.67	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	44.29	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	2.60	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	4.21	\$/MILLION BTU
1975 FAMILY INCOME	12104.17	\$/YEAR	PROJECTED 1985 FAMILY INCOME	16215.60	\$/YEAR
1975 HEATING DEGREE DAYS	4026		PROJECTED 1985 HEATING DEGREE DAYS	2662	
1975 NUMBER OF CUSTOMERS	371315		PROJECTED 1985 NUMBER OF CUSTOMERS	409300	

STATE DUMMY VARIABLE IS NOT RELEVANT

MONETARY VARIABLES ARE DEFLATED BY A SURROGATE PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-.470	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN FAMILY INCOME	.839	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	.473	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	1.084	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	7.900	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	9.906	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.2540	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	2933346.770	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	4054723.632	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.3823	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-268194.432	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	135543.734	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	39610.786	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-120313.713	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-480679.033	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

UTILITY NAME: TACOMA PUBLIC UTILITIES LIGHT DIVIS
CITY NAME: SEATTLE (FEA REGION 10)

TABLE 1--INDEPENDENT VARIABLE PROJECTIONS AND THEIR IMPACT

1975 ELECTRICITY PRICE	11.74	\$/THOUSAND KWH	PROJECTED 1985 ELECTRICITY PRICE	12.78	\$/THOUSAND KWH
1975 NATURAL GAS PRICE	2.60	\$/MILLION BTU	PROJECTED 1985 NATURAL GAS PRICE	4.61	\$/MILLION BTU
1975 FAMILY INCOME	13507.00	\$/YEAR	PROJECTED 1985 FAMILY INCOME	18265.25	\$/YEAR
1975 HEATING DEGREE DAYS	2645	DAYS	EXPECTED (AVERAGED) 1985 HEATING DEGREE DAYS	2626	DAYS
1975 NUMBER OF CUSTOMERS	81820		PROJECTED 1985 NUMBER OF CUSTOMERS	86400	

STATE DUMMY VARIABLE IS RELEVANT, STATE IS: WASHINGTON

MONEY VARIABLES ARE DEFLATED BY A REAL PRICE INDEX

DEMAND COMPONENT ANALYSIS

CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN ELECTRICITY PRICE	-0.764	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN NATURAL GAS PRICE	1.416	THOUSAND KWH
CHANGE IN ELECTRICITY CONSUMPTION PER FAMILY DUE TO 1975-1985 CHANGE IN HEATING DEGREE DAYS	0.029	THOUSAND KWH

NOTE: COMPONENTS WILL NOT SUM TO FORECASTED VALUES IN TABLE TWO BECAUSE INTERACTION EFFECTS WHICH OCCUR WHEN VARIABLES ARE CHANGED SIMULTANEOUSLY ARE NOT INCLUDED IN THE COMPONENT ANALYSIS.

TABLE 2--ELECTRICITY CONSUMPTION FORECASTS

1975 ESTIMATED ELECTRICITY CONSUMPTION PER FAMILY	12.856	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION PER FAMILY	14.249	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION PER FAMILY	1.1088	
1975 ESTIMATED ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1051426.254	THOUSAND KWH
1985 PREDICTED ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA	1231094.176	THOUSAND KWH
RATIO OF 1985 TO 1975 ELECTRICITY CONSUMPTION FOR UTILITY SERVICE AREA	1.1709	

TABLE 3--SENSITIVITY OF DEMAND TO VARIATION IN THE INDEPENDENT VARIABLE PROJECTIONS

CHANGE IN ELECTRICITY CONSUMPTION IN UTILITY SERVICE AREA:

WHEN ELECTRICITY PRICE IS RAISED BY 10 PERCENT	-81429.126	THOUSAND KWH
WHEN INCOME IS RAISED BY 10 PERCENT	41153.755	THOUSAND KWH
WHEN NATURAL GAS PRICE IS RAISED BY 10 PERCENT	12026.617	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 10 PERCENT	-36451.689	THOUSAND KWH
WHEN HEATING DEGREE DAYS IS RAISED BY 50 PERCENT	-146301.629	THOUSAND KWH

NOTE: CHANGES ARE CALCULATED ON THE 1975 BASE.

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